A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

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Construction Methods

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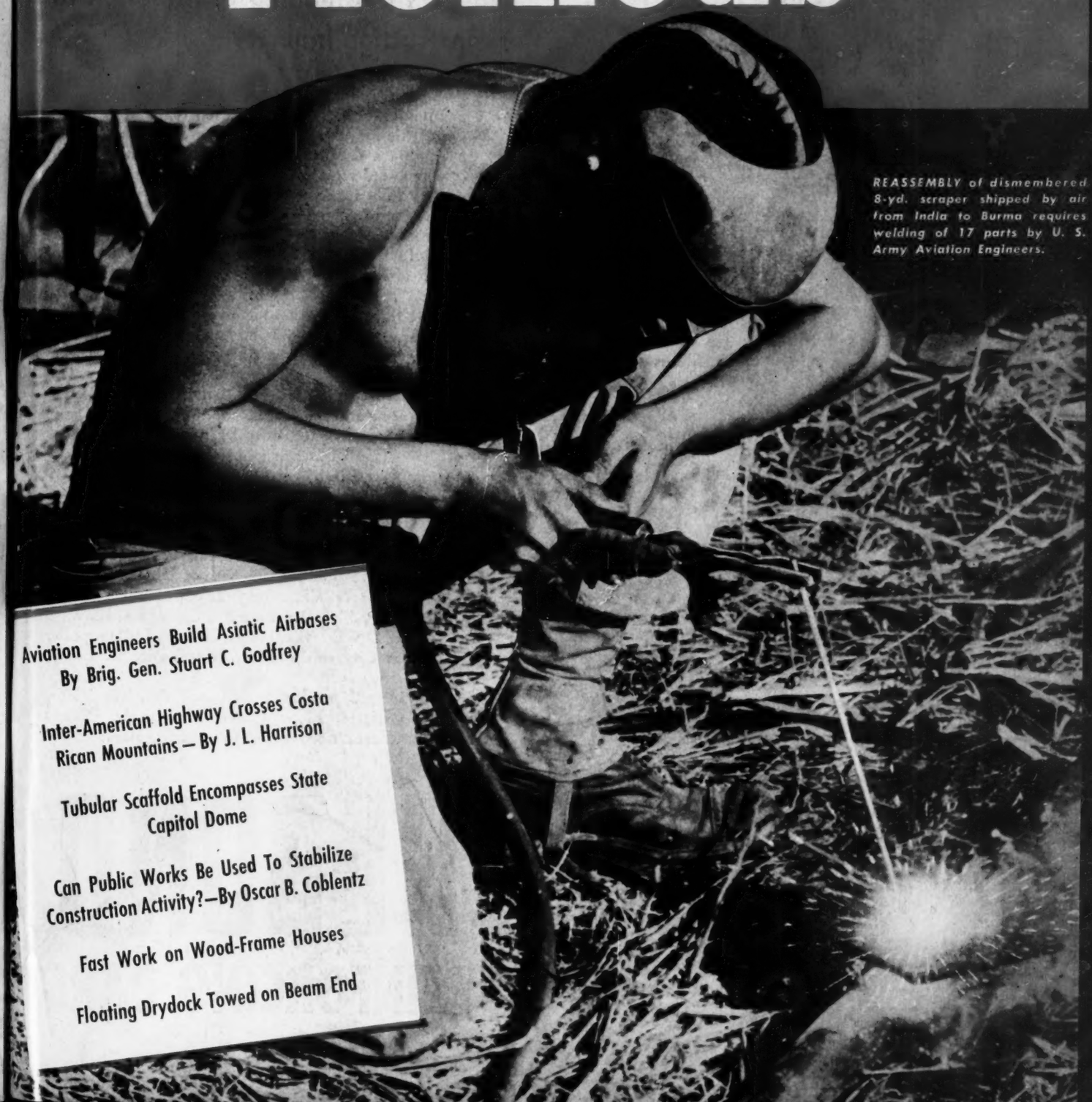


REASSEMBLY of dismembered 8-yd. scraper shipped by air from India to Burma requires welding of 17 parts by U. S. Army Aviation Engineers.

Aviation Engineers Build Asiatic Airbases
By Brig. Gen. Stuart C. Godfrey

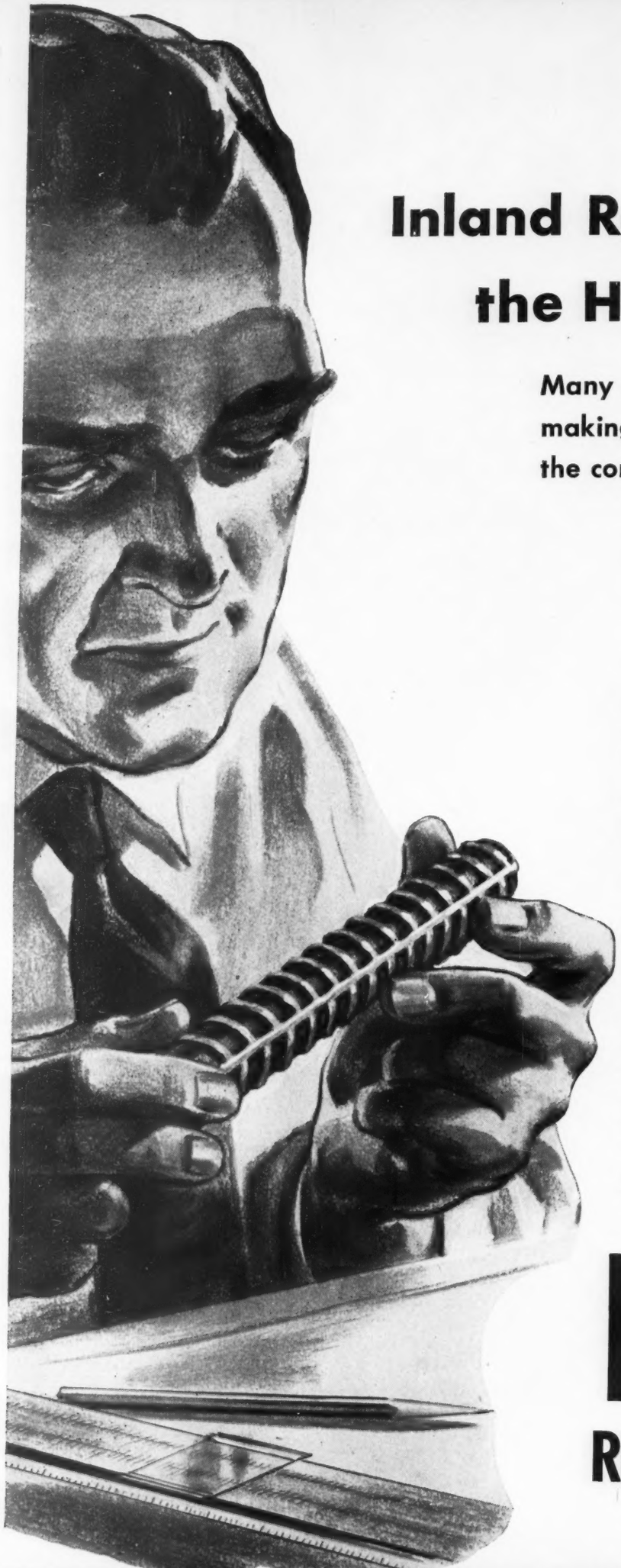
Inter-American Highway Crosses Costa Rican Mountains — By J. L. Harrison

Tubular Scaffold Encompasses State Capitol Dome

Can Public Works Be Used To Stabilize Construction Activity?—By Oscar B. Coblentz

Fast Work on Wood-Frame Houses

Floating Drydock Towed on Beam End



Inland Research Creates the HI-BOND Re-Bar

Many practical difficulties overcome in making an outstanding contribution to the construction industry

Inland research actually scored twice in developing the HI-BOND Reinforcing Bar—first in designing a deformed bar of extremely high bond value, and equally important in developing steel mill rolls for efficient and accurate production.

Inland engineers, with long experience in construction, knew that there was need for a better reinforcing bar. After years of study a design was created, but it presented a number of problems before it could be rolled successfully. In fact, there were those who said it was impractical to roll. That was a challenge to Inland roll designers and mill men. After studies of the problems, rolls were cut and billets were formed into HI-BOND Bars—bars that were true to design and accurate—bars that could be rolled in any quantity, restricted only by wartime conditions.

The HI-BOND Bar is another example of how Inland research develops and makes available new steel mill products—products that do a better job—products that often save steel and cut labor costs.

Inland has prepared a booklet, "Engineering Tests Prove Bonding Strength of HI-BOND Reinforcing Bar." Write for your copy! Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill.

Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

Principal products: Sheets, Strip, Tin Plate, Bars, Plates, Floor Plates, Structurals, Piling, Rails, Track Accessories, Reinforcing Bars.

HI-BOND
REINFORCING BARS

CURRENT JOBS

. . . and Who's Doing Them

BUILDINGS

Public—Army contract for barracks at Camp Cooke, Calif., was awarded to **R. E. McKee** of Los Angeles, for $4,040,850. **William L. Crow Construction Co.**, of New York, N.Y., has $1,947,500 Navy contract for storehouses at Scotia. Low bid of $1,353,000 was received from **R. E. McKee**, of Glendale, Calif., for veterans building at Reno, Nev. **Bird Construction Co., Ltd.**, of Winnipeg, will build residences at Charleswood, Man., for $1,200,000.

Industrial—Power Plant at Port Washington, Wis., will be built by **Milwaukee Bridge Co.**, of Milwaukee, for $7,119,500. **Austin Co.**, has contract for $5,000,000 plant at Tiffin, Ohio. **C. R. Meyer & Sons Co.**, of Oshkosh, Wis., will construct $3,000,000 power plant at Green Bay. Paper mill at Deferiet, N. Y., will be built by **George A. Fuller Co.**, of New York, for $3,000,000. **Foundation Co. of Canada, Ltd.**, of Montreal, will build $1,022,500 plant addition at Ville St. Pierre, Que.

Commercial—Apartments in Washington, D. C., will be built by **Standard Construction Co.**, of Washington, for $1,750,000. **Durham & Irvine**, of Philadelphia, has $1,500,000 contract for housing at Wilmore, Pa. Army contract for postal concentration center at Oakland, Calif., went to **MacDonald & Kahn, Inc.**, of San Francisco, for $1,430,841. **City National Construction Co.**, of Philadelphia, will build homes at Glenside, Pa., for $1,080,000. **Pigott Construction Co., Ltd.**, of Toronto, has $1,000,000 contract for hospital addition at Toronto.

HEAVY CONSTRUCTION

Runways at Elgin Field, Fla., will be built for Army by **Noonan Construction Co.** and **Smith Engineering & Construction Co.**, of Pensacola, for $3,468,252. Contract for piers at California Point, Calif., was awarded to **Duncanson Harrelson Co.** and **Healy Tibbitts Construction Co.**, of San Francisco, for $3,330,730. Car-holding facilities at Port Chicago, Calif., will be constructed by **Frederickson & Watson Construction Co.**, of Oakland, for $3,000,000. **Gahagan Construction Corp.**, of New York, N. Y., has $3,000,000 contract for airport fill at East Boston, Mass. Army contract for channel in California went to **Bressi-Bevanda Constructors, Inc.**, and **Macco Construction Co.**, of Clearwater, for $2,528,350. Runway at Fort Worth, Tex., will be built for Army by **Texas Bitulithic Co.**, of Dallas, for $1,935,000. **T. L. James, of Ruston, La.**, has $1,347,500 Army contract for facilities at Barksdale Field. **Moore & Roberts**, of San Francisco, Calif., will build $1,154,304 air depot at Sacramento.

HIGHWAYS

Among recent highway contract awards are the following: Connecticut: $271,427 to **Arute Bros., Inc.**, of New Britain. Illinois: $447,839 to **Powers-Thompson Construction Co.**, of Joliet; and $284,478 to **Robert R. Anderson Co.**, of Chicago. Indiana: $364,861 to **Moellering Construction Co.**, of Fort Wayne. Kentucky: $404,829 to **Middle West Roads Co.**, of Noblesville, Ind. Maryland: $282,100 to **Dutcher Construction Co.**, of Queenstown; and $232,381 to **Williams Construction Co.**, of Middle River. Missouri: $225,919 to **Cameron-Joyce & Co.**, of Keokuk, Iowa. New Mexico: $302,180 and $270,356 to **Brown Bros.**, of Albuquerque. North Dakota; $334,231 to **Northern Improvement Co.**, of Fargo. Ohio: $264,619 to **R. Kammer**, of Dayton. Oregon: $777,725 to **Warren Northwest, Inc.**, of Portland; and $545,924 to **C. J. Montag & Sons**, of Portland. Tennessee: $654,000 to **Ballenger Paving Co.**, of Greenville, S. C. Texas: $336,161 to **H. Page**, of Austin; and $226,687 to **Cagle & Proctor**, of Houston. Utah: $218,087 to **Utah Construction Co.**, of Ogden. Canada: $1,223,555 to **Campbell Construction Co., Ltd.**, of Vancouver, B. C.; $1,308,940 to **Fred Mannix & Co., Ltd.**, of Calgary, Alta.; and $225,000 to **Compagnie de Construction of Quebec, Ltd.**, of Joliette.

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

A. E. PAXTON, Publisher

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AUGUST, 1945

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **ARMIES OF OCCUPATION** are supplied by captured Nazi war goods —p. 61

How **WAR CONSTRUCTION IN ASIA** illustrated ancient and modern techniques —p. 64

How **AIRBORNE EQUIPMENT** was carried to advance airfield sites in Burma —p. 68

How **FLOATING DRYDOCK** for seaplanes featured sleeve pontoon towers —p. 69

How **STATE CAPITOL DOME** was covered with free-standing scaffold —p. 70

How **TRUCK-MOUNTED CRANE** drove guard rail posts —p. 72

How **TUNNEL** was driven by Seabees through mud seams and coral —p. 73

How **PUBLIC WORK** can be used to sustain construction activity —p. 74

How **PORTABLE SHOP TOOLS** facilitated engine maintenance jobs —p. 76

How **ARC-WELDING UNIT** was mounted on Army jeep —p. 77

How **BAMBOO REINFORCEMENT** was tested in construction of concrete stadium —p. 79

How **HANGAR-TYPE WAREHOUSE** was built for supply storage in France —p. 80

How **PRODUCTION LINE METHODS** were used on housing project —p. 82

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How **PROPER USE OF ROPE** promotes safety and conserves materials —p. 90

How **FLOATING DRYDOCKS** were tipped to pass through Panama Canal —p. 92

How **GLUED, LAMINATED ARCHES** were built of treated wood —p. 94

How **AIR-ENTRAINED CONCRETE** permitted earlier pavement finish at Army airfield —p. 98

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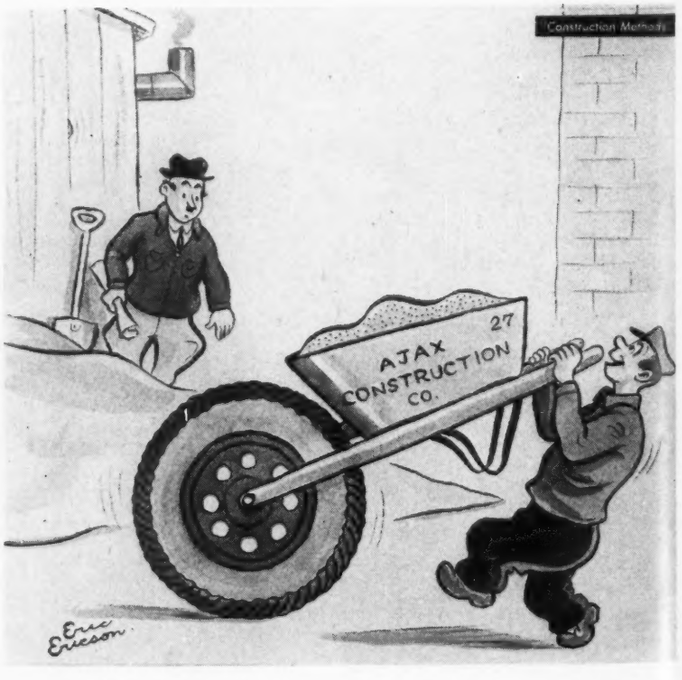
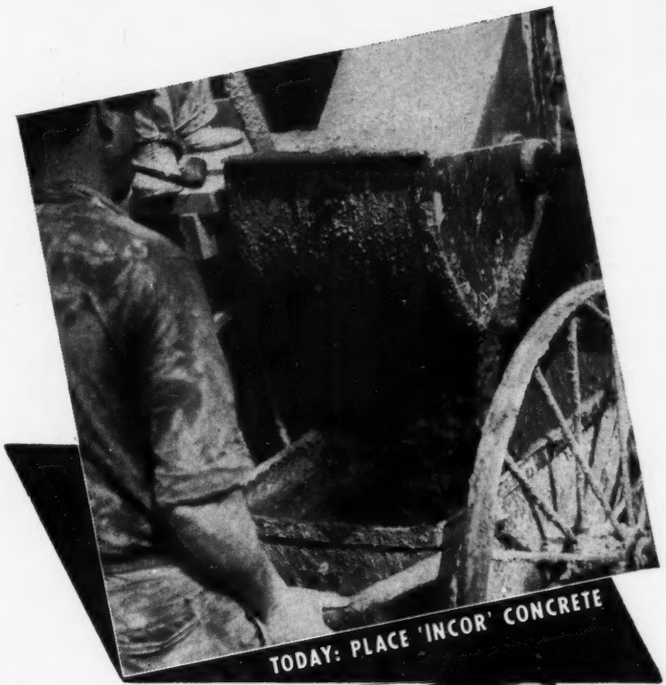
"Can you see any better now?"

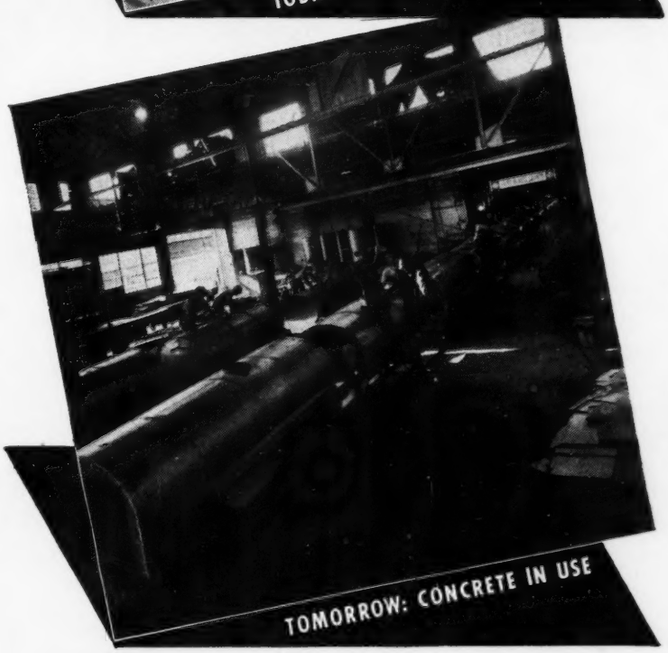
"Sunday driver!"



"I got a flat and borrowed a spare from a truck"

WHAT 'INCOR' 24-Hour Curing MEANS TO YOUR JOB





HERE are the facts on how 'Incor' 24-Hour Cement serves and protects your job. Prime requisite for good concrete is adequate, thorough curing—difficult under job conditions, because it is hard to keep concrete wet 5 days or longer. 'Incor' concrete cures thoroughly, attains service strength, in one day, which means:

STRUCTURES IN USE WEEKS SOONER

24-hour form removal . . . high-speed, economy schedules . . . 50 to 60% less forms

HEAVY-DUTY FLOORS OVER A WEEK-END

Thoroughly cured concrete 5 or 6 days sooner . . . no plant tie-up . . . greater wear resistance

WATERTIGHT CONCRETE ASSURANCE

Easy-placing, non-segregating mixes . . . thorough curing in 1-2 days . . . less chance of forgetting to keep concrete wet

PLANT CONVERSION SPEEDED

Machinery bases ready overnight . . . driveways, loading docks in use days sooner . . . durable, heavy-duty concrete.

Plan it with 'Incor'* for better concrete—quick, sure, economical! *Reg. U. S. Pat. Off.

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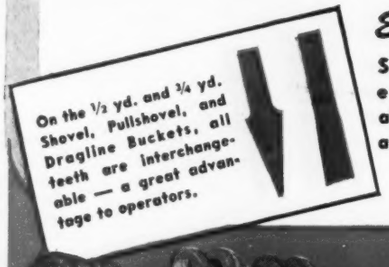
• FRONTS, BOTTOMS, SCOOPS and TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.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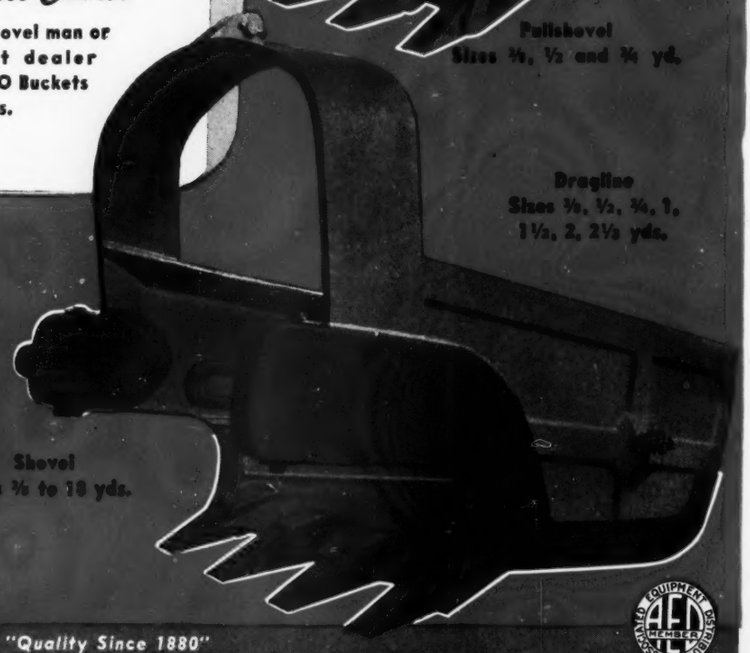
Sizes ¾, ½ and ¾ yd.


Dragline
Sizes ⅛, ½, ¾, 1, 1½, 2, 2½ yds.

Shovel
Sizes ⅛ to 18 yds.

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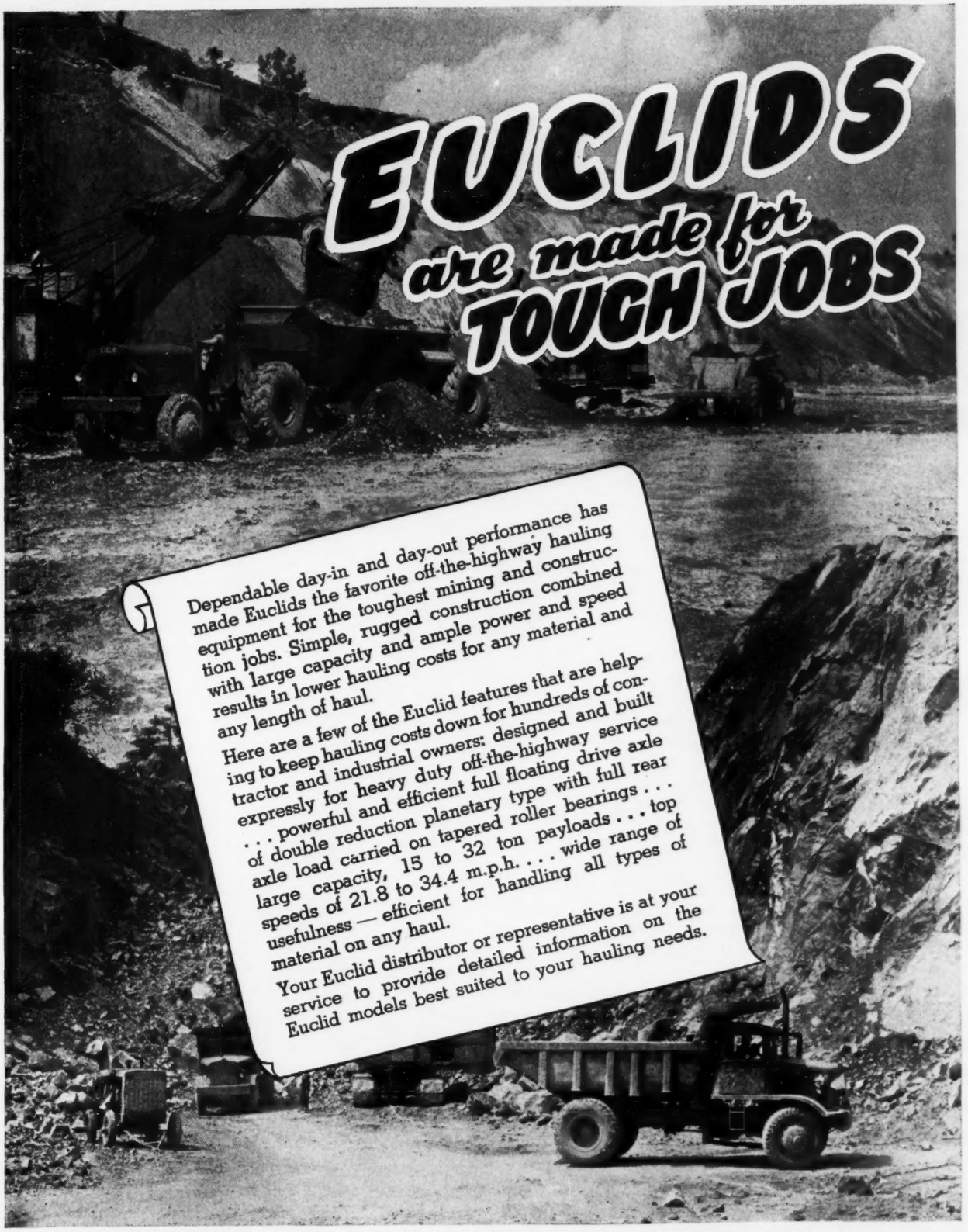
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New tire with built-in shock shield has greater bruise resistance, lasts longer

THE TIRES you see here are taking what might be grueling punishment for some kinds of tires. They're being used in airport construction, carrying heaped loads, 55 each shift, on a 1.8-mile road trip haul. Rocks and ruts can't always be avoided, and every time a tire "hits" them it's a pile-driver blow—the kind of impact that could cause bruises and blow-outs. Such punishment often leads to expensive repairs, delays, or costly replacements.

But these B.F.Goodrich tires are well protected against such losses by a special *shock shield* built in under the tread. This shield, developed by B.F.Goodrich engineers, is a set of *four* breakers—layers of rubber-coated rayon cords—between the tread and the plies. The breakers are in *pairs*, with the cords in each pair running parallel to each other—but with each pair running in opposite directions to give balanced strength. The breakers are cushioned with thick layers of special shock-resistant rubber.

Under impact, the cords in the breakers stretch together, *not* across each other, and return to their original position. The blow is *distributed* and *absorbed* by the rubber cushions; the shock passed on to the cord body is greatly reduced.

Proof that users of B.F.Goodrich off-the-road tires benefit by this exclusive construction principle is shown in their own service records. One strip mine operator reports an average of over 4000 hours of service from BFG tires compared to 1600 hours from another make; another operator reports 17,599 miles compared to 6476 for the best ordinary brand.

You can make worth-while savings—and you can *see* the savings in your own records of comparison tests of B.F.Goodrich tires alongside other makes.

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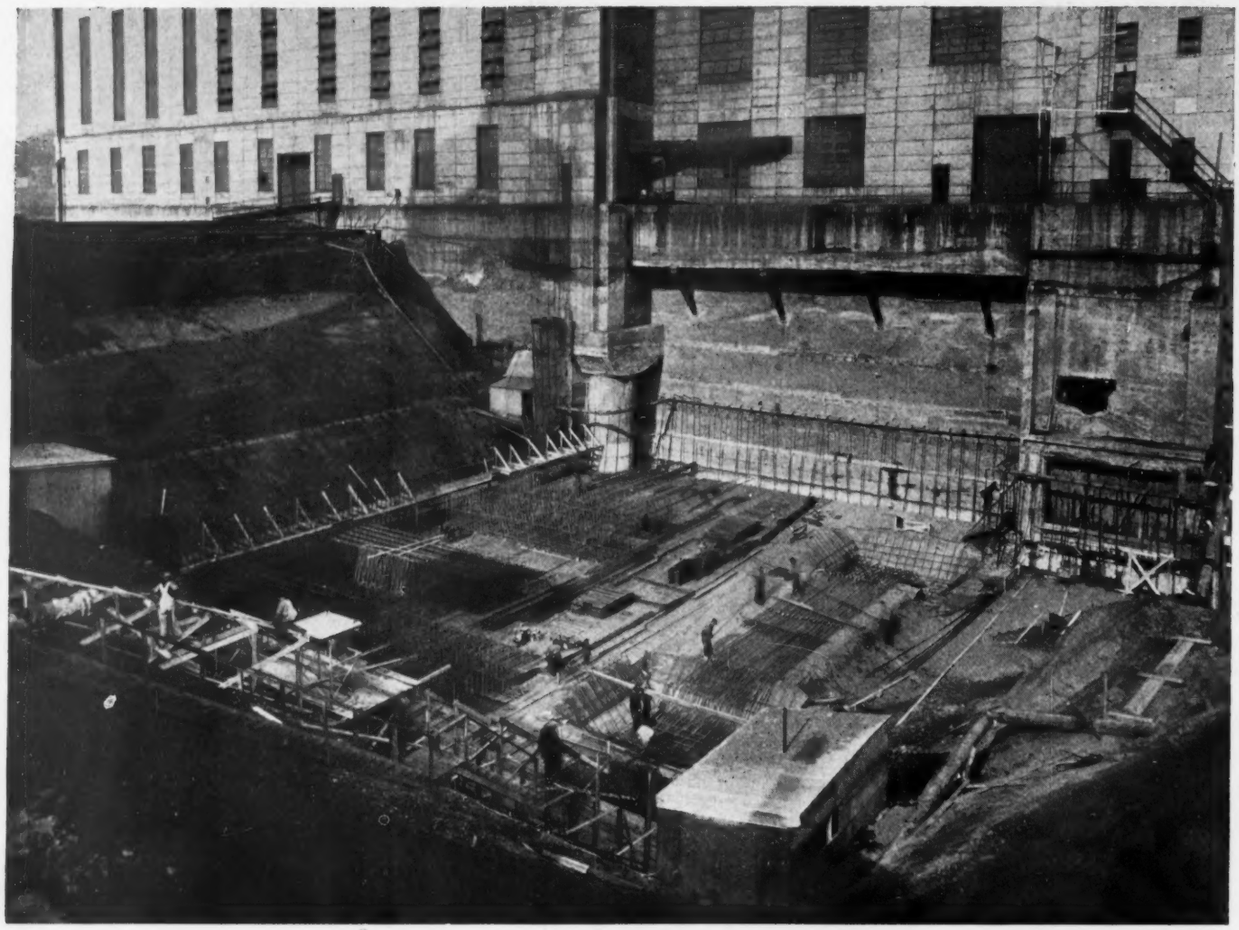

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With the Northwest "Feather-Touch" Clutch Control for easy operation the Northwest Dual Independent Crowd that utilizes force other shovels waste, the Northwest Welded Shovel Boom (and no Northwest welded shovel-boom has ever failed), the Cushion Clutch that increases both cable and machine life, the Uniform Pressure Swing Clutches that eliminate the machine torturing jerks and jerks of ordinary band type swing clutches, you are equipped for any type of digging at the lowest possible cost per yard. It is the most up-to-the-minute piece of equipment in the field—today or tomorrow!

Let us serve you—state size and type machine you are interested in and we will be glad to help you [illegible]

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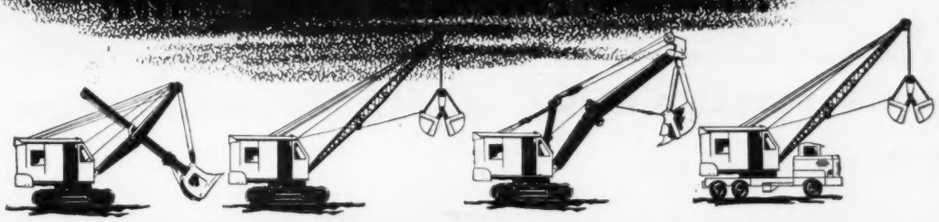

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"-AND I DISCOVERED MORE THAN

"I guess I'm like the average contractor when it comes to buying an air tool. I was simply looking for a breaker for demolition work . . . what I really got was more than I bargained for! With the proper tools, I find my Sullivan K-81 paving breaker is my "Jack of all Trades" . . . performing a variety of duties . . . from driving form stakes on my paving jobs to the heaviest kind of concrete demolition . . . and doing it economically and efficiently. Why, I even used a bunch of my K-81's for cleaning cars when hauling sticky clay on a tunnel job. Yes, my K-81's are breaking records for steady work on a variety of different jobs."

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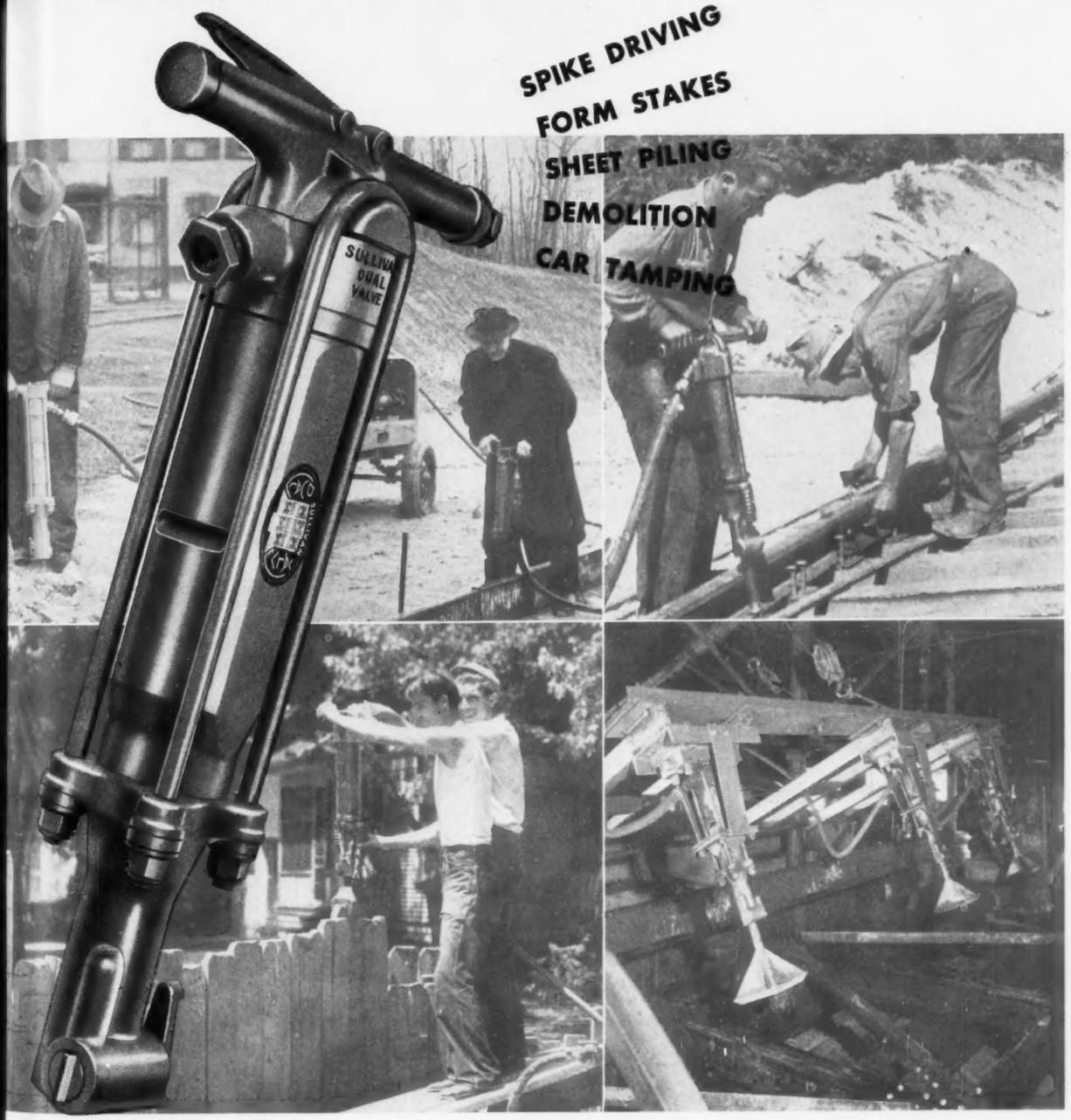

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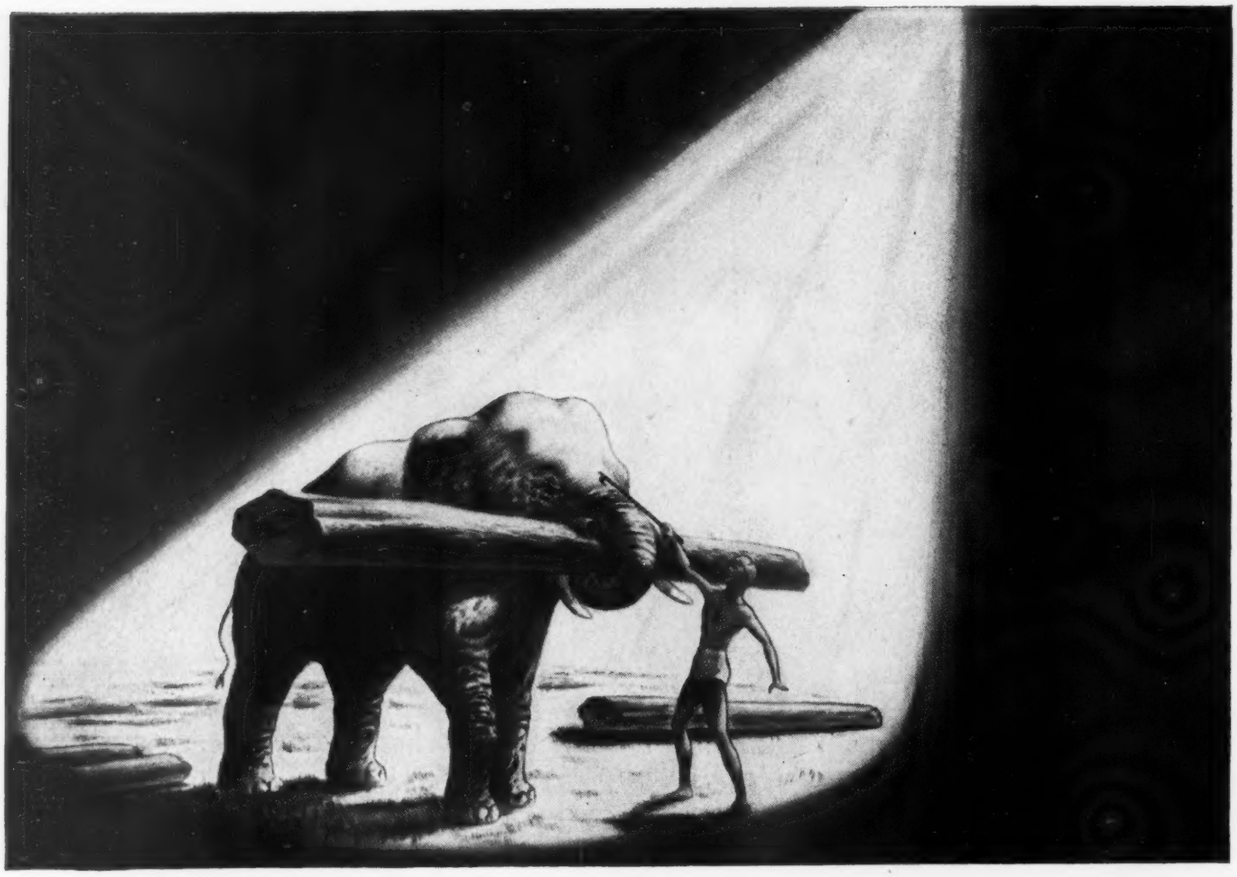
Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

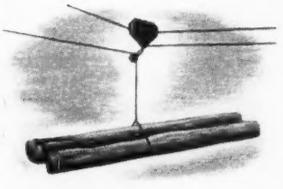


Wire rope toughness means *Long* useful life!

Only by selecting wire rope of the proper strength and toughness can you secure true rope economy—long, useful life! For built-in strength and toughness give wire rope the *reserve* resistance which means greater rope efficiency.

Strength and toughness are put into wire rope when the steel is refined and processed. Here quality begins with the scientific blending of the proper ingredients in their correct proportion to produce the one wire rope best suited for *your* specific purpose.

Metallurgical research and control are *added* ingredients of every Wickwire Rope. This close watch over quality continues through the production of the correct alloy for use in each type, size and construction of wire rope, and then through each successive step of wire drawing and wire rope manufacture.



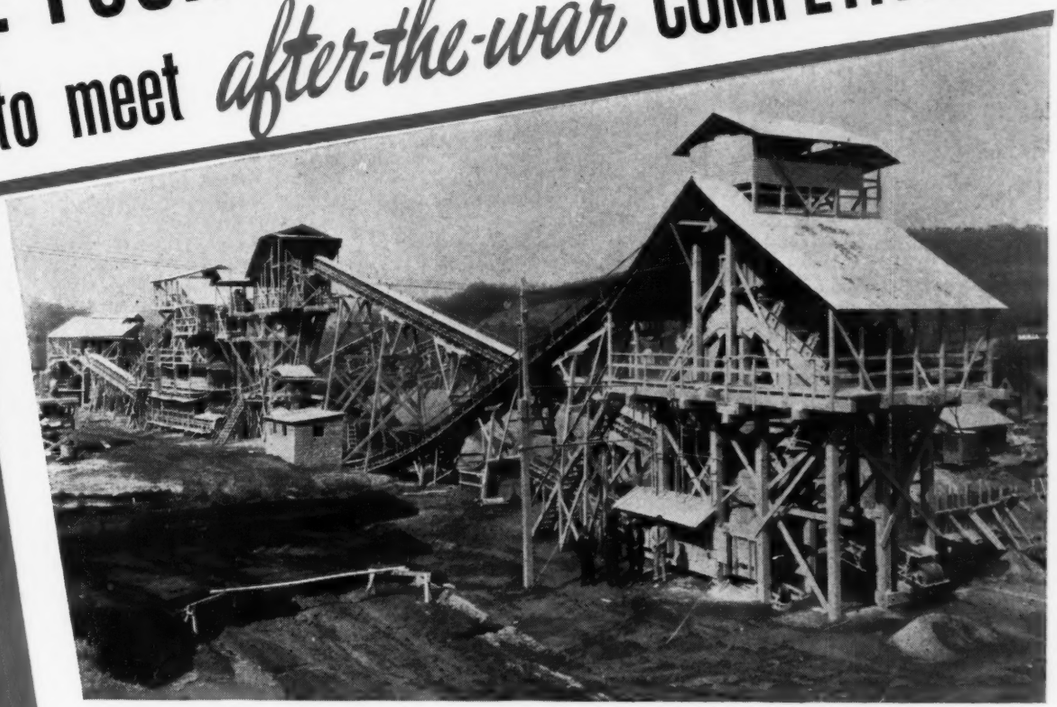
Thousands of wire rope users—old hands and new—have found our specially prepared manual, "Know Your Ropes" valuable in making their work easier and prolonging rope life. It contains 78 "right and wrong" pictures, 40 wire rope life savers, 20 diagrams, tables and charts. Send for your FREE COPY today.

WICKWIRE SPENCER *Steel Company*

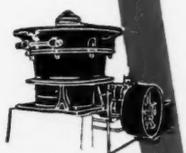
500 FIFTH AVENUE, NEW YORK (18), N. Y.

ABILENE • BOSTON • BUFFALO • CHATTANOOGA • CHICAGO • CLINTON (MASS.) • DETROIT • HOUSTON • LOS ANGELES • PHILADELPHIA • SAN FRANCISCO • TULSA • WORCESTER

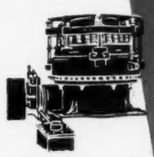
WILL YOUR PLANT BE *ready* to meet *after-the-war* COMPETITION?



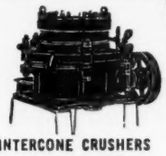
Complete modern Telsmith plant . . producing both coarse and fine aggregates in several sizes.



PRIMARY BREAKERS

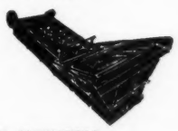


GYRASPHERE CRUSHERS



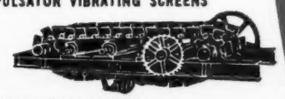
INTERCONE CRUSHERS

JAW CRUSHERS



SAND CLASSIFIERS

PULSATOR VIBRATING SCREENS



HEAVY DUTY FEEDERS

● AFTER VICTORY your plant will face a changed market. Peacetime construction contracts and customers will be different. Competition will be keener. Such changes call for plant planning *now!* Rearrangements and additional equipment will be needed. For example, more re-crushing, screening, washing capacity . . . to produce the smaller sizes, in the quantities and quality your market demands. Modernize with Telsmith equipment. Give your plant this necessary product flexibility. Boost its output with Telsmith big capacity, free-from-grief, continuous, fast operation. Less power is required. Upkeep is lower. Telsmith equipment keeps your production costs down to a figure that insures you a good profit. Telsmith's 40 years of equipment-building complete-plant-engineering *know-how* is at your disposal. Write us in detail; or send for Bulletin E-10.

E-6

TELSMITH *Equipment*

FOR SAND, GRAVEL AND ROCK CRUSHING PLANTS

SMITH ENGINEERING WORKS, 510 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

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Brandeis M. & S. Co., Louisville 8, Ky.
Rish Equipment Co., Charleston 22 & Clarksburg, W. Va.
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Is YOUR *State*

IT MAY COME *Tomorrow!*

Peace—and with it the problems of reconverting industry and reinstating 10 to 20 million persons in gainful, productive occupations. How is it to be done? By government support of the unemployed, with leaf-raking projects of no permanent value, and subsistence only for the worker? Or by planned, durable projects, of lasting economic value to the community, and providing man-size wages and a rising standard of living?

Don't write to your Congressman! Congress has done its part, for the moment. Write to your State, County and Municipal Officials. Insist that they organize, plan and participate in this sound, constructive program.

Ready with its PLANS ?

ACT NOW—TO ASSURE VITAL POST-WAR HIGHWAY CONSTRUCTION PROGRAM—FIRST STEP TOWARD PROVIDING MILLIONS OF JOBS

POSTWAR employment is not merely a national concern. It is a state concern. It is a county concern. It is a municipal concern.

Adequately planned public works is a constructive backlog to America's future prosperity. Sound planning *now* will create barriers to mass unemployment tomorrow—and eliminate make-shift leaf-raking projects that cost money but do not create wealth.

Now is the time to get your public work projects in blueprint form. Now is the time to plan, with complete specificity, the Highways, Airports, Sewage Treatment and Water Purification Projects that will provide *productive* employment when it is *needed.*

How much work should be planned, how long it should be carried on, in order to achieve the desired ends, are questions receiving various answers in different places. The American Association of Highway Officials' estimates of construction needed immediately is over seven billions of dollars worth.

The American Road Builders' Association envisions an annual investment of three billions of dollars in roads, for an indefinite period. Events still to come will show what is actually necessary or practical, but a definite starting point, and a substantial portion of the work to be done immediately, are provided by the Federal Aid Highway Act of 1944. This measure contemplates a billion dollars worth of highways to be built each year, for three years. This will amount to a lot of roads, and will provide a lot of jobs. Larger programs may be in prospect, or needed to attain our full objective, but the Federal program will conflict with none of them, and has the merit of being ready to start as soon as individual States have prepared plans, and have appropriated their share of the funds.

Furthermore, under the provisions of the Federal Aid Highway Act of 1944, the Federal Government will defray one-half the costs of surveys and plans for highway construction for your State. Under these circumstances what State can afford not to participate? What reason is there for any state to delay the preparation of its plans?

Communicate with your State Highway Department at once. Make sure your State will be ready, when the day of Victory dawns, to carry on its share of this great and *vital program.*

American Road Builders' Association has issued informative booklets on the subject of road building in relation to national economic stability.

Highway Departments, Civic Groups, Commercial Clubs and individuals should study these, to be well informed on the full significance of this program.

Write for "The Road Ahead" and "Blueprint for Post-War Roads—and Jobs." Address, American Road Builders' Association, Washington, D. C. or Link-Belt Speeder Corporation, Chicago 9, Ill.

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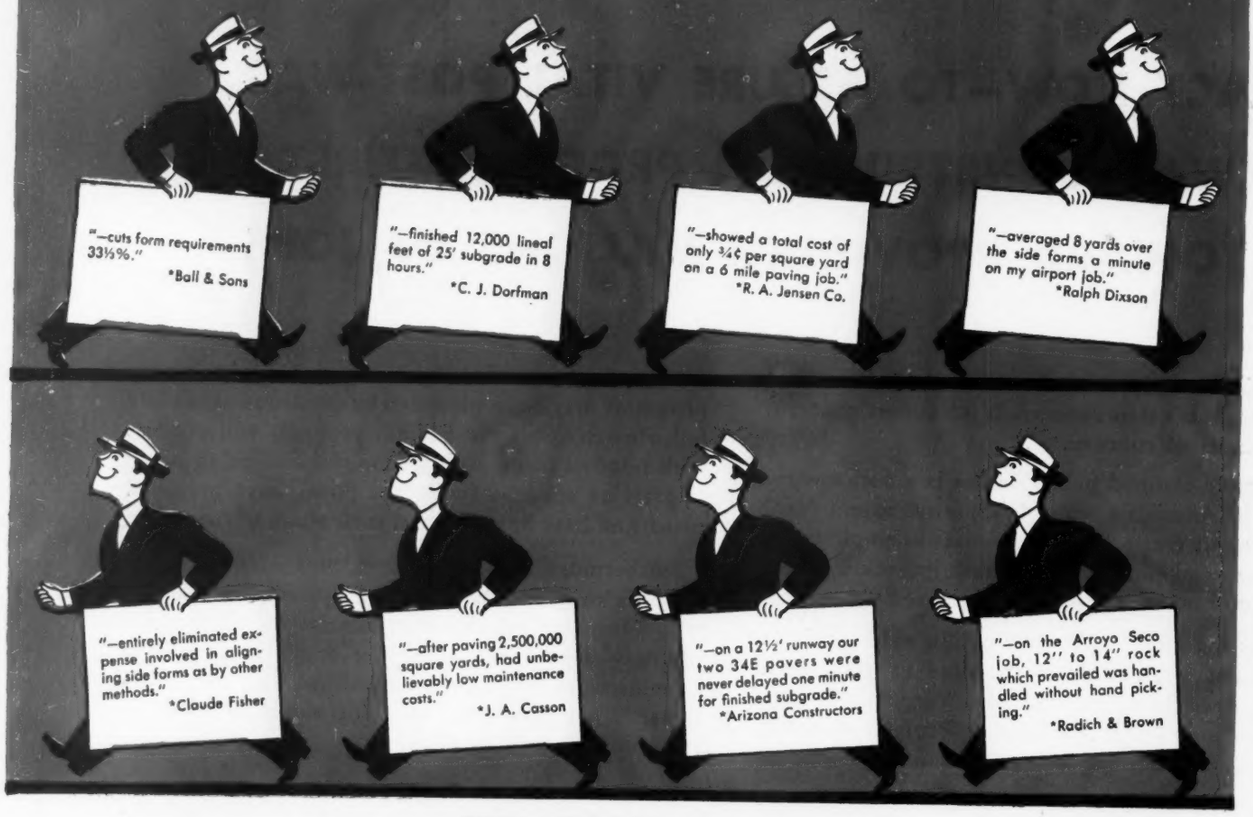
BUILDERS OF THE MOST COMPLETE LINE OF CRAWLER AND WHEEL-MOUNTED CRANES, SHOVELS AND DRAGLINES FOR EFFICIENT LOW COST HANDLING OF MATERIALS IN THE INDUSTRIAL, EXCAVATING, CONSTRUCTION AND ROAD BUILDING FIELDS - - -

Contractors are our best salesmen!


"—cuts form requirements 33⅓%."
*Ball & Sons
"—finished 12,000 lineal feet of 25' subgrade in 8 hours."
*C. J. Dorfman
"—showed a total cost of only ¾¢ per square yard on a 6 mile paving job."
*R. A. Jensen Co.
"—averaged 8 yards over the side forms a minute on my airport job."
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"—entirely eliminated expense involved in aligning side forms as by other methods."
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"—after paving 2,500,000 square yards, had unbelievably low maintenance costs."
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"—on a 12½' runway our two 34E pavers were never delayed one minute for finished subgrade."
*Arizona Constructors
"—on the Arroyo Seco job, 12" to 14" rock which prevailed was handled without hand picking."
*Radich & Brown

Every owner of a STANDARD - LEWIS subgrader says *unreservedly* that it excels in every way

Here are a few reasons why:

The Standard-Lewis subgrader is designed with a sectional stationary cutting blade (adjustable to any desired subgrade contour) on each side so that grading may be done in either direction without turning machine or time consuming "pull backs." It can be raised by power to pass over manholes, culverts and other obstructions, while in operation. Wheels may be turned 90° to permit towing by truck or tractor over bridges or through narrow places. Many other features make it the one subgrader designed to meet postwar requirements for better, faster paving.

GET THE WHOLE STORY— SEND FOR THIS BULLETIN

STANDARD STEEL CORPORATION

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Distributors throughout the United States and Canada

***Space will not permit full addresses which will be sent on request.**

SCHRAMM OFFERS THESE *Exclusive* COMPRESSOR • ECONOMY FEATURES

This Stands for Honorable Service for Our Country

Four features make Schramm Air Compressors ideal for construction jobs . . . **(1)** 100% water cooled **(2)** Compact—lightweight **(3)** Mechanical intake valve **(4)** Forced feed lubrication. These features enable you to do your compressed air job quickly—easily—economically!

Schramm Air Compressors are designed for heavy duty, continuous service, with minimum attention. They are built in sizes ranging from 20 to 420 cu. ft. of actual air, in every type of mounting and assembly. Lightweight, compact, sturdy, they are easily moved about on the job. Other Schramm features include long life discharge valve and complete push button electric starter. Make your construction jobs easier by using a Schramm Air Compressor to get air wherever needed. Write today for details contained in new, informative booklets just published.

SCHRAMM INC.

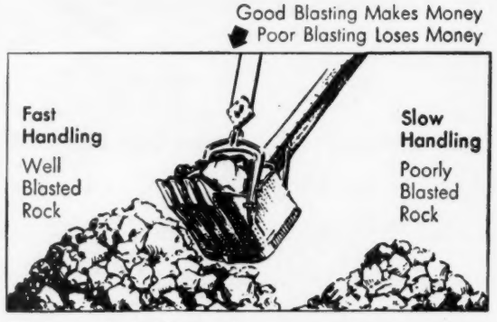
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

"Penny-Wise and Pound-Foolish" is bad practise in blasting, too!

When it comes to blasting, today's engineers know that it's false economy to be thrifty in small matters and wasteful in big ones. They realize that the cost of explosives is small when measured in terms of the final cost of moving rock. They know that true saving is a matter of *selection* and application—that you can't wisely buy explosives on price alone.

Over-all blasting economy comes from the use of the right explosive in the right place, in the right amount. It takes into account such factors as the shovel, haulage, the crusher and secondary blasting. It cuts down delays and idle hours.

Savings such as these often begin with an Atlas explosive—an explosive selected from the Atlas family of 120 kinds and grades. Call in the Atlas Representative. He can often help produce real operating economies.



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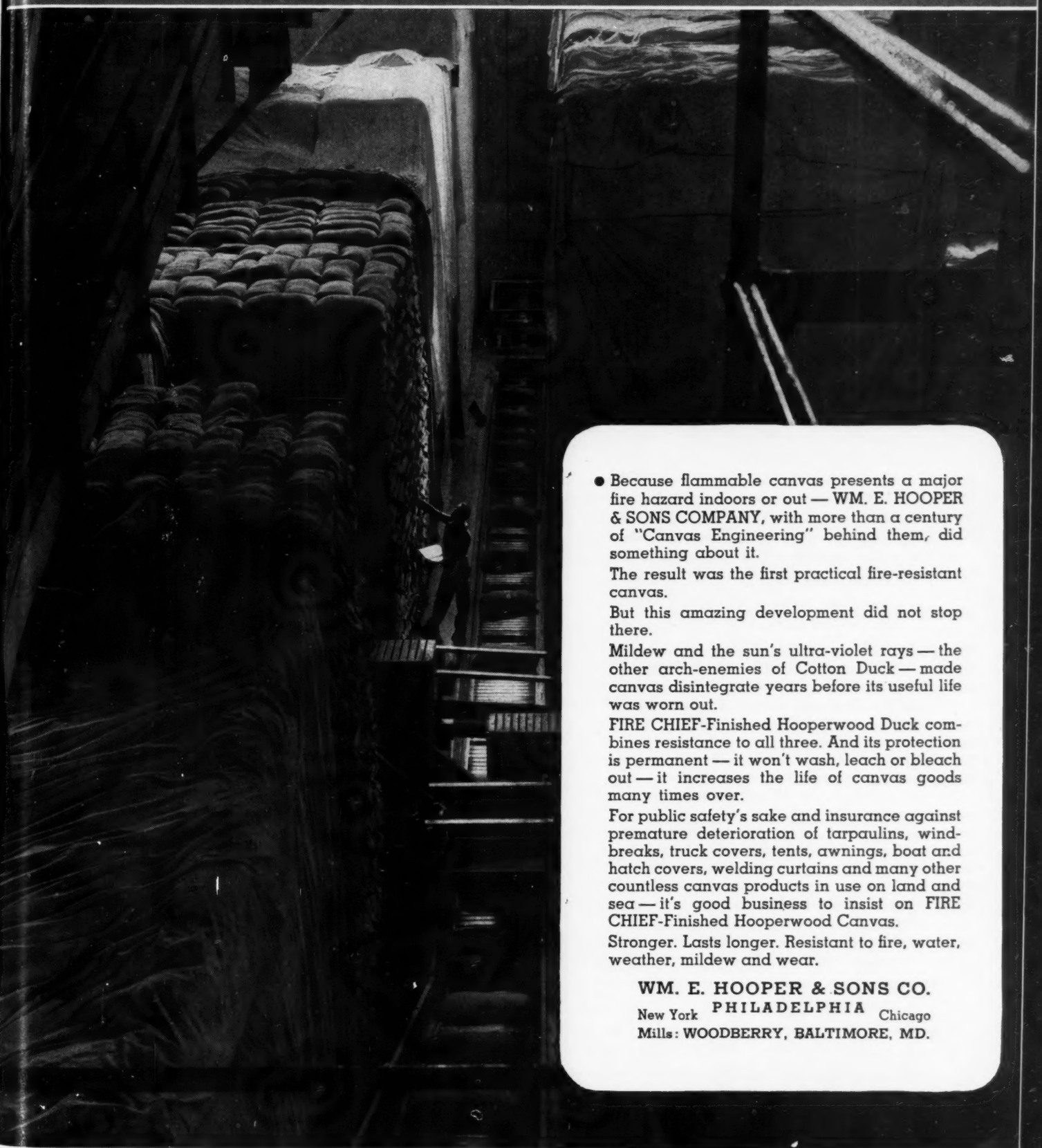
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

Outlasts Other Canvas
MANY TIMES OVER



- Because flammable canvas presents a major fire hazard indoors or out — WM. E. HOOPER & SONS COMPANY, with more than a century of "Canvas Engineering" behind them, did something about it.

The result was the first practical fire-resistant canvas.

But this amazing development did not stop there.

Mildew and the sun's ultra-violet rays — the other arch-enemies of Cotton Duck — made canvas disintegrate years before its useful life was worn out.

FIRE CHIEF-Finished Hooperwood Duck combines resistance to all three. And its protection is permanent — it won't wash, leach or bleach out — it increases the life of canvas goods many times over.

For public safety's sake and insurance against premature deterioration of tarpaulins, windbreaks, truck covers, tents, awnings, boat and hatch covers, welding curtains and many other countless canvas products in use on land and sea — it's good business to insist on FIRE CHIEF-Finished Hooperwood Canvas.

Stronger. Lasts longer. Resistant to fire, water, weather, mildew and wear.

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Mills: WOODBERRY, BALTIMORE, MD.

• *Fire-Chief Finished* (PATENTED) •

HOOPERWOOD COTTON DUCK

Now UP TO 2000 hp!

STANDARD 2000-HP TRI/CLAD MOTORS NOW AVAILABLE

THEY GIVE EXTRA PROTECTION 3 ways

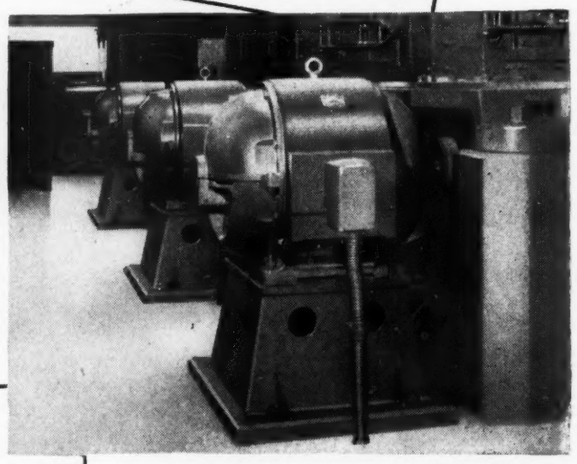
1 Extra protection from physical damage—Cast-iron construction. Upper portion completely enclosed. Streamline, cast-iron end shields. Corrosion-resisting finish.

2 Extra protection from electrical breakdown—Windings of Formex* wire, strongly bonded with oil- and moisture-resistant synthetic resins, stand up under abrasion or "heat-shock."

3 Extra protection from operating wear and tear—Sleeve or ball bearings, in dust-tight housings. Sleeve-bearing design is a further refinement of well-proved Tri-Clad bearing proportions, with cast-in "air seal" to further insure oil tightness of the housing.

The triple-protected construction that has made General Electric's Tri-Clad motor so popular in the small and intermediate sizes has now been extended to motors of 2000-hp capacity. On your *big* drives, these new Tri-Clad motors will meet severe conditions with greater assurance than ever of dependable service and long life.

The Tri-Clad motor, in its wide range of types and sizes, is industry's most popular integral-hp motor. Chances are there's a standard Tri-Clad to meet your requirements "on the nose." For information on G.E.'s complete line of Tri-Clad motors, ask for Bulletin GEA-3580. *General Electric Company, Schenectady 5, N. Y.*



Three of the new, large Tri-Clad motors, each rated 200 hp, 1200 rpm, driving coal pulverizers in a Southern steam-electric plant

*Trade-mark reg. U.S. Pat. Off.

HERE'S TODAY'S WIDER RANGE OF STANDARD SIZES	
TRI/CLAD Type K	—1 hp to 2000 hp at 1800 rpm
TRI/CLAD Type KG (High starting torque, low starting current)	—5 hp to 200 hp at 1800 rpm
TRI/CLAD Type KR (High starting torque, high slip)	—Available to 100 hp in speeds required for high-slip, flywheel drive (punch press, etc.)

Buy all the BONDS you can—*and keep all you buy*

GENERAL ELECTRIC

TRI/CLAD MOTORS

The Right Trucks FOR ALL TRADES

Light loads or heavy pulls, long-distance hauling or local delivery—Chevrolet trucks will do the job economically and dependably, because they are designed, engineered and built for truck work exclusively.

Because truck operators recognized the famous features of Chevrolet trucks as "built-in values" they bought more Chevrolet trucks than any other make in seven of the last nine prewar years. These same features are continued in the 1945 Chevrolet trucks. Should your needs demand extra payload capacity, your Chevrolet dealer can provide the right truck by the installation of the necessary equipment (auxiliary axles, springs, trailers, bodies, etc.).

Buy only as much truck as you need, because it's payload, not chassis weight, that pays profits. *Buy a Chevrolet truck—the right truck for all trades.*

BUY MORE WAR BONDS
HELP SPEED THE VICTORY

NEW 1945 CHEVROLET TRUCKS

All Chevrolet trucks are equipped with the famous valve-in-head six-cylinder truck engine—recirculating ball-bearing steering—diaphragm-spring clutch—hypoid rear axle—articulated hydraulic brakes—sturdy truck frame.

HEAVY-DUTY TRUCKS, 134½-inch and 160-inch wheelbases—Load-Master engine, 93 horsepower, 192 foot-pounds of torque—4-speed transmission, power take-off opening—hypoid single-speed full-floating rear axle—2-speed rear axle—auxiliary rear springs—all-steel cab.

LIGHT DELIVERY PICK-UP TRUCK, 115-inch wheelbase—90-horsepower engine—3-speed Syncro-Mesh transmission—hydraulic shock absorbers, front and rear—all-steel cab—unit-designed body.

SCHOOL BUS CHASSIS, 160-inch and 195-inch wheelbases—safety features to comply with all state regulations: vacuum-power brakes—Tru-Stop, propeller-shaft hand brakes—propeller-shaft guard—special heavy-duty front springs and front axle—two-stage, progressive-action rear springs—double-acting shock absorbers—20-gallon side-mounted fuel tank. Other features same as heavy-duty.

CHEVROLET MOTOR DIVISION
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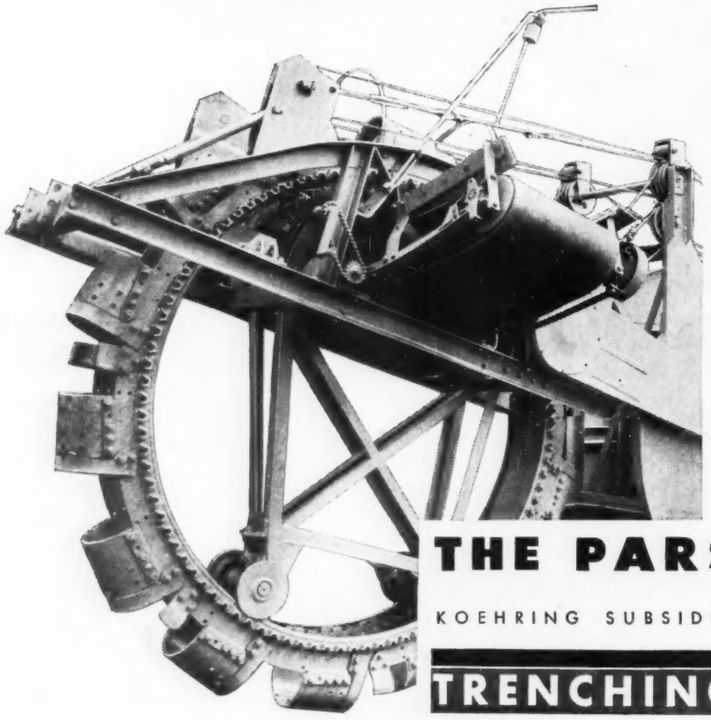
DETROIT 2, MICHIGAN

CHEVROLET

ONE OUT OF EVERY 3 TRUCKS IS A CHEVROLET

Now

A PARSONS *Wheel* TRENCHLINER



Get the facts on the new Parsons 200 Wheel Trenchliner today. Modern, designed in 1945 for 1945. Outstanding performance on tough pipeline jobs — in gumbo, clay, shale or compacted sand — because all the latest improvements are incorporated in the new Parsons 200 Wheel Trenchliner. Ask for your Parsons 200 Wheel Trenchliner Catalog today. It's just off the press.

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TRENCHING EQUIPMENT

PARSONS

...and endures through the years in service!

STARTING from the time you load its 13-foot lengths onto your trucks . . . continuing during its rapid assembly in the trench . . . and lasting throughout its long, dependable service underground, Transite Sewer Pipe makes important contributions to more efficient, economical sewage disposal.

Check these money-saving advantages:

FAST INSTALLATION. Transite's light weight means easier handling; its long 13-foot lengths reduce the number of joints in the line, speed up assembly.

LESS INFILTRATION. Its floating sleeve-type joint combines flexibility with tightness . . . guarding against costly infiltration and cutting down on the load at the disposal plant.

HIGH DELIVERY CAPACITY. The smooth interior surface of this asbestos-cement pipe assures high delivery capacity . . . frequently permits smaller pipe, or flatter grades with correspondingly shallower trenches.

CORROSION-RESISTANT—outside, inside and all the way through! Transite's high corrosion resistance has been proved in countless installations, under a wide range of soil conditions.

If you are planning sewage works projects for the days ahead, you will want all the facts about Transite Sewer Pipe. Brochure TR-21A is free on request. Address Johns-Manville, 22 East 40th St., New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE *SEWER* PIPE

FOR EFFICIENT, ECONOMICAL SEWAGE DISPOSAL

This Metal Blade in your SKILSAW cuts all masonry products Faster, Cleaner, *Without Dust!*

Embedded diamond grit gives this SKILSAW metal blade a faster-working, longer-lasting edge for smoother, cleaner cutting of all masonry products, hardened asbestos cement, glass, and a host of other building materials.

Outlasts abrasive discs 5 to 1 . . . there's only ⅛-inch loss of radius during the entire life of the blade. *Saves time* . . . eliminates need of frequent adjustment of saw base (a real time killer, as any user of abrasive discs knows.) *It's safer* . . shatter-proof, no danger of flying pieces of abrasive. *It's dustless* . . . a practical, easy-to-install water attachment supplies water to point of cut, eliminates dust. This blade cannot be used dry.

Available in thin, medium or heavy types in 7, 8, 9 and 10-inch sizes to fit SKILSAW Models "77", "825", "87" and "127". Ask your distributor today to demonstrate the *greater cutting speed, safety* and *economy* of the SKILSAW Diamond-Grit Blade!

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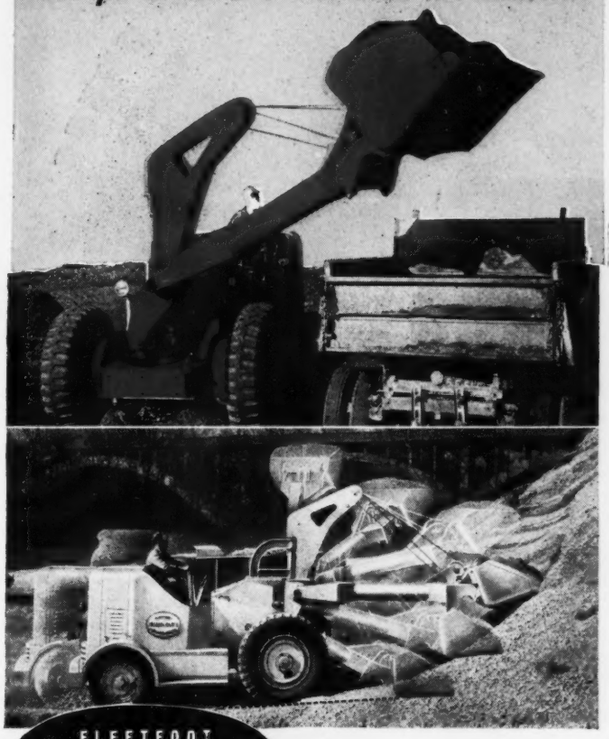
because it digs, SWINGS, hoists and dumps in ONE continuous movement



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JAEGER LOADER
CRANE and EXCAVATOR

LOADS TRUCKS *3 TIMES FASTER*

This all-purpose Loader fills a long-felt need for contractors, highway depts., counties, municipalities, quarries . . . With 180° swinging boom and power-closing bucket it loads to either side in one continuous movement — with 11 fewer clutch moves, in ⅓ the usual time . . . NO MANEUVERING — WORKS IN TIGHT PLACES . . . Crowding power is tremendous — with 65 h.p. engine in ¾ m.p.h. low gear and 80% of load on giant front driving wheels it can dig into any material, backfill, grade, do prime moving and light excavating . . . And with 6 traction speeds and power steering it travels to job at 15 m.p.h.

Send for 52 page Catalog JL-5, showing a hundred year round uses and advantages.

½ to 2 Yd. Buckets — Handle Any Material from Rock to Snow.

12-25 Ft. Crane Attachment

Can Dig Outside Its Wheels

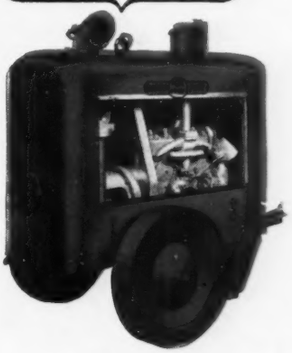
ENCLOSED YET FULLY ACCESSIBLE

JAEGER postwar model "SURE PRIMES" are weather protected for even longer pump life . . .

2"–10,000 G.P.H.

Streamlined outside as well as in, these pumps shed weather like a duck's back, keep pump and engine clean, dry, quick-starting and sweet running for the extra years Jaeger builds into pumps for contractors. Instant-opening panels, and enclosures that lift off or swing completely open, give quick access to every part. They're streamlined in performance, too — by many improvements developed in building more than 50,000 pumps for war . . .

4" — 40,000 G.P.H.



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- "Inherent" priming action plus "jet" priming—faster and doubly sure.
- Replaceable liners in all sizes 2" to 10"
- All seals accessible for inspection.
- More efficient power.
- Micrometer workmanship.
- Certified performance.

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... to pull a gear
... straighten a shaft
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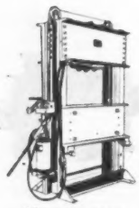
... force a pin ... or?

you will find 100 uses —
for its
100 tons of hydraulic power!

WANT AN ANSWER to those special problems where you need to press, squeeze, pull, force or otherwise use 100 tons of handy power? . . . Get a Rodgers Shop Press and save yourself time, labor and trouble.

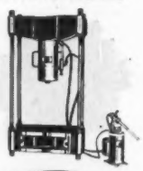
The Rodgers is such a versatile unit for so many varied applications in a shop that usually it is considered indispensable. Here is why it's versatile — look at the Rodgers Model 108 above, for example. It is simple and sturdy, yet so flexible that the opening between the top frame and bolster may be set from 4½" up to 32½" by adjusting the alloy steel pins upon which the bolster rests. A hand crank easily raises or lowers the bolster for adjustment. The 100-ton cylinder may be mounted as shown, inside the press frame head, or hung below — and is adjustable across the entire width of the frame. Ram travel of the cylinder may be either 6½" or 13". When desirable, the press can be used resting on its side for more convenient handling of large pieces. Power is supplied by the powerful Rodgers 4-Speed Hand Pump, mounted on press or separate, or by a Rodgers Power Pump Unit. Once you get a Rodgers, you'll say too . . . "it's the handiest tool in the shop".

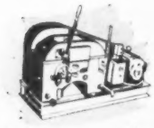
Write us today for *all* of the details . . . and our new catalog.



Shop Presses

Portable Presses





Power Pump Units

Crawler-Track Presses

Rodgers Hydraulic, Inc.

7403 Walker St., St. Louis Park, Minneapolis 16, Minn.

Hydraulic Power Equipment

P&H

ADD UP THE ADDED VALUES

Hydraulic Control—smoother, faster, easier operation than you've ever known in an excavator.

Planefary Transmission—faster, more accurate crowd controls—far lower maintenance costs.

Better Steering—can turn right or left abruptly or make a complete circle without stopping.

Tractor Type Crawlers—save hundreds of dollars each year in trouble-free travel.

All Welded Construction—rolled alloy steels provide greater strength, greater rigidity—longer life throughout.

Ask for literature giving details on these and the many other P&H advantages.

Dollars Buy More When You Buy a P & H

P&H Excavators are built in sizes from 3/8 to 5 cubic yards capacity; gasoline, Diesel or electric power. Write for literature.

P&H EXCAVATORS

4494 W. National Ave.,
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

The cost-saving Ton Mover built with General's Famous Top-Quality!

● Here's deep-biting traction . . . rugged resistance to abuse that lets you haul peak loads *faster* . . . at lower costs.

The General Deep Cleat is built like an armored shock-absorber. Its heavy lug-type tread is self-cleaning yet there is more tread surface to carry extra loads . . . to bite-in and hold . . . to stand-up under hardest service. Traction is two-directional. A special impact-cushioning tread shoulder stops shock concentrations in the tread—distributes impact evenly throughout the tire.

Inner construction, too, is extra heavy-duty with dual and triple beads; more plies than rated, extra-denier rayon cord and special ply bonding that reinforces the carcass where greatest stresses occur.

General's Deep Cleat, gives you the kind of money-saving tire life that has always resulted from General's unchallenged Top-Quality . . . advanced design and 30 years' experience in making America's finest tires.

The GENERAL TIRE

GENERAL EARTH MOVER — GENERAL ROCK SPECIAL

THE GENERAL TIRE & RUBBER COMPANY • AKRON, OHIO

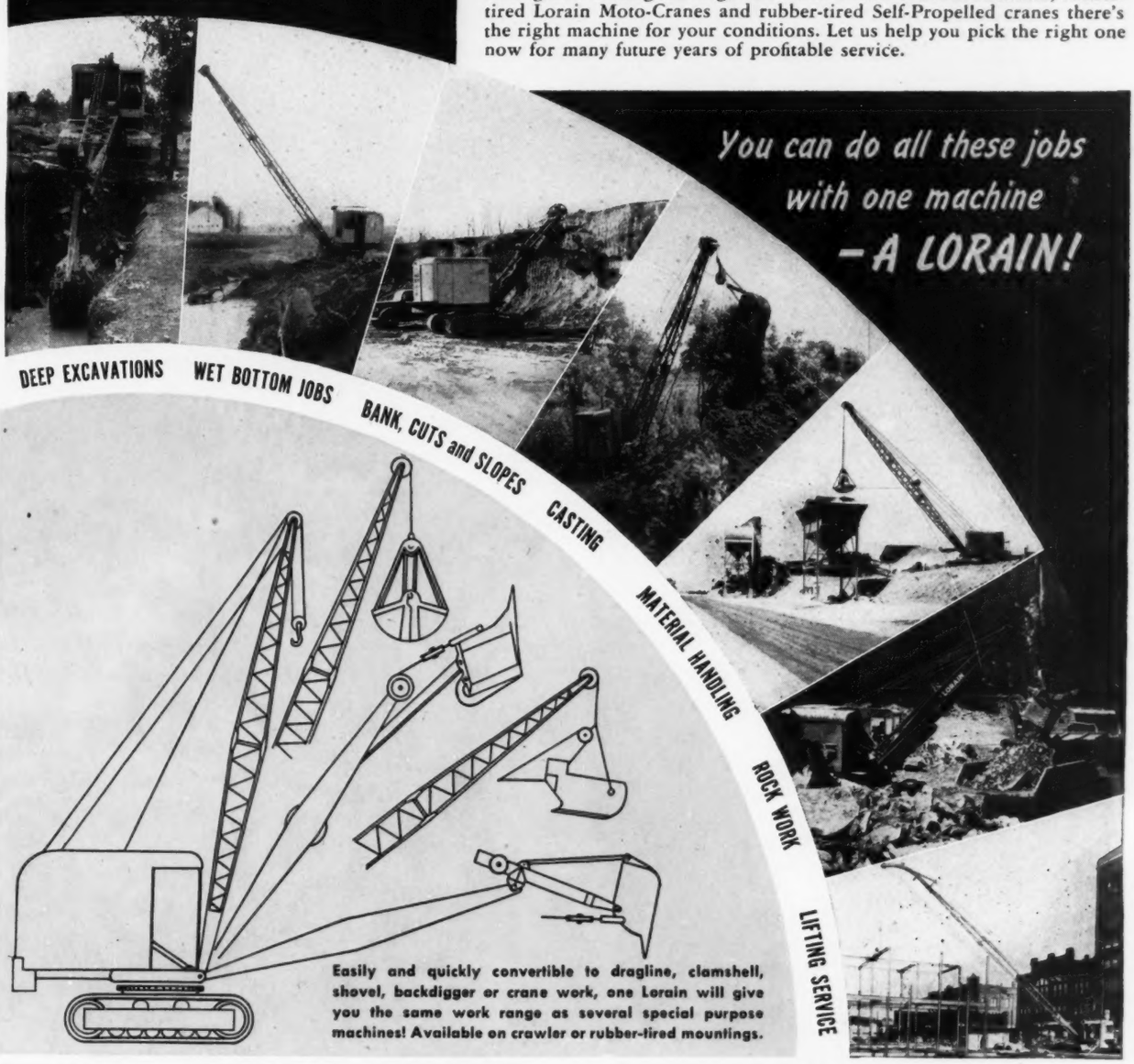
YOU'LL GET *MORE* OUT OF A *MULTI-PURPOSE* LORAIN!

CAREFUL job analysis shows that the vast majority of construction operations can be broken down into the seven basic work classifications shown below. Since no one can tell exactly which of these types of work—or combinations of them—your present or next contract will bring, the wisest investment is in equipment that can be adapted to every kind of work. And no other machines will fit into any and all classifications as well as multi-purpose Lorain Cranes and Shovels!

When you plan your next equipment purchase, look beyond the immediate job—consider the long range possibilities of what you buy. In stamina, in basic engineering and adaptability to every kind of work, Lorain Cranes and Shovels are designed to give you *years* of service on *all kinds* of jobs.

The five convertible and interchangeable front-ends shown actually give you five machines in one—an all-purpose outfit ready to cover the entire range of excavating, material handling and building jobs.

Ask your nearest Lorain distributor—or write us direct —for the facts and figures. Among the large and small crawler-mounted Lorains, rubber-tired Lorain Moto-Cranes and rubber-tired Self-Propelled cranes there's the right machine for your conditions. Let us help you pick the right one now for many future years of profitable service.


You can do all these jobs with one machine —A LORAIN!
DEEP EXCAVATIONS
WET BOTTOM JOBS
BANK, CUTS and SLOPES
CASTING
MATERIAL HANDLING
ROCK WORK
LIFTING SERVICE
Easily and quickly convertible to dragline, clamshell, shovel, backdigger or crane work, one Lorain will give you the same work range as several special purpose machines! Available on crawler or rubber-tired mountings.

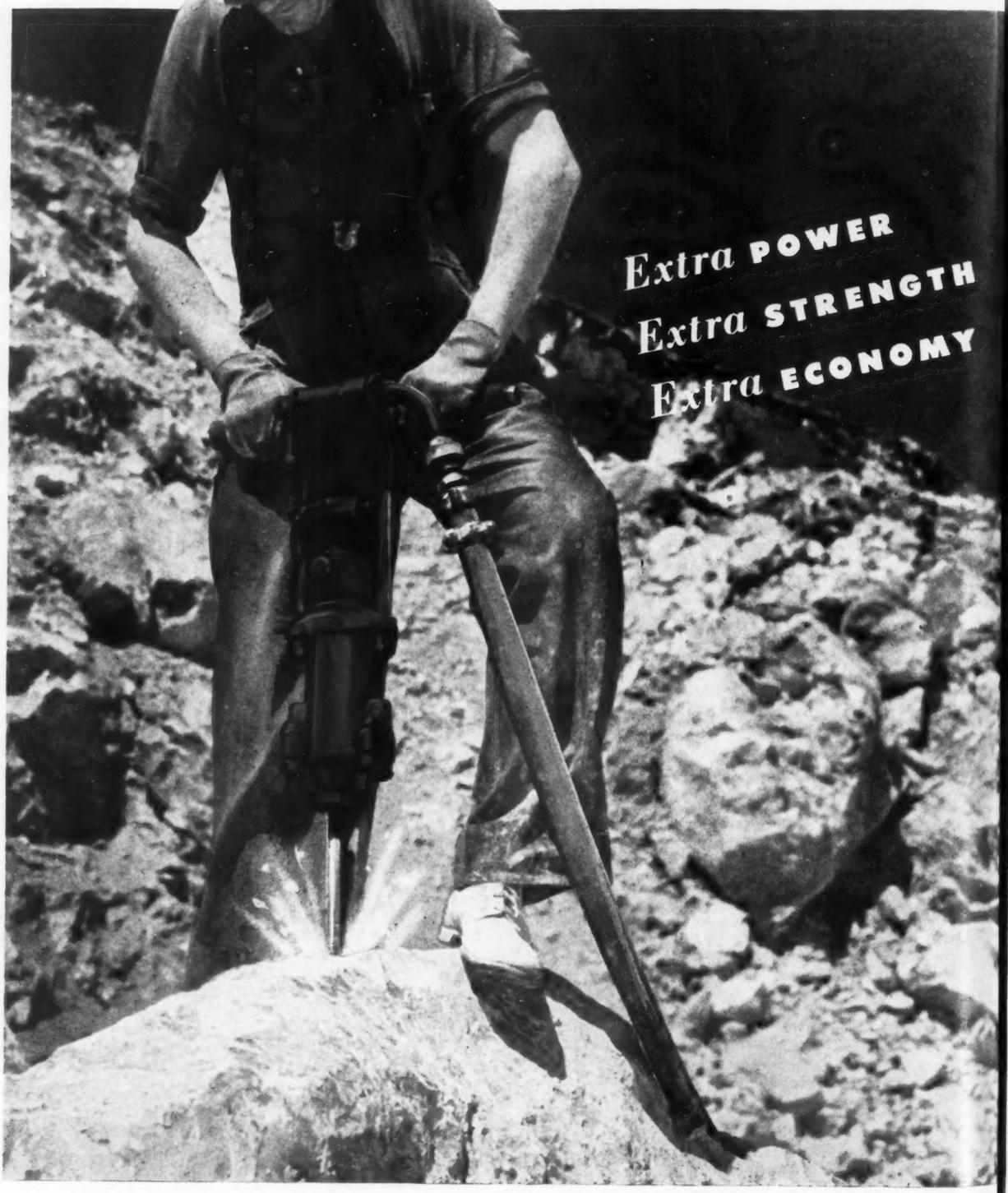
Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

Thor



ROCK DRILLS

with the Extras

The outstanding operating efficiency of Thor Rock Drills is the result of *exclusive* design and construction features that provide *extra* power, strength and economy. These major advantages mean more work, done faster at lower cost.

- Short-travel, tubular valve, self-seating and tubular-guided for longer wear without loss of efficiency.
- Sturdy, trunk-type piston.
- Piston, Valve and Cylinder in perfect balance.
- Rugged, easy-operating retainer with fully-enclosed springs
- Powerful, direct-line hole-blowing.
- Removable chuck in chuck driver, inexpensive to replace.

With a full range of sizes for light and heavy duty service in Sinkers, Drifters and Stopers, Thor has a Rock Drill for every job.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois
New York Los Angeles

YOU GET PERFORMANCE *EXTRAS*
IN *ALL* THOR CONTRACTORS AIR TOOLS

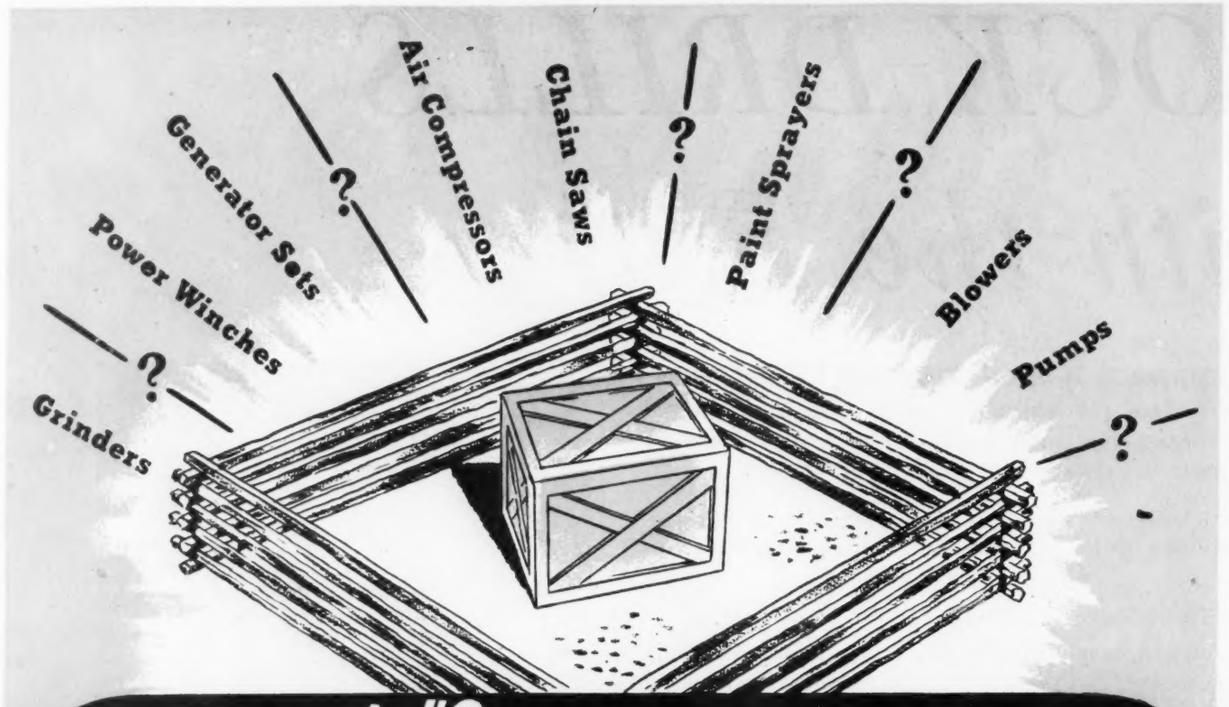
Paving Breakers
Sinker Rock Drills
Drifter Rock Drills
Stoper Rock Drills
Clay Diggers
Sump Pumps
Nail and Spike Drivers
Sheeting Drivers
Backfill Tampers
Concrete Grinders
Portable Saws

THOR'S SPRING-CUSHIONED RETAINER

always works smoothly and easily, lasts longer. Fully-enclosed springs, protected from dirt and sealed at proper tension . . . cannot be over-tightened, clogged or jammed. A push with a toe opens or closes the retainer . . . drill steel changes are faster and easier. Steady cushioning action and dirt-proof construction lengthens retainer life and cuts maintenance cost.

Thor PORTABLE POWER TOOLS

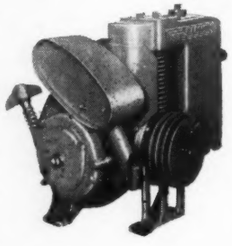
PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS



Don't "fence in" your postwar product WITH AN OUTMODED ENGINE!

■ If your postwar product needs power, you will want an engine that gives the most efficient, trouble-free service for the most years.

Kiekhaefer's long specialized experience in small engine design, plus the courage to scrap old theories disproved by research, development and test, has resulted in a distinct contribution to the light engine field. Kiekhaefer-Built Mercury, 2-cycle, air-cooled, industrial engines combine MOST POWER PER POUND OF WEIGHT with easy-starting, smooth operation, ruggedness, long life . . . and versatility that makes them adaptable to a thousand uses.



A Kiekhaefer-Built Mercury Engine will give your product new advantages, greater efficiency, increased value and improved appearance. Keep on looking to Kiekhaefer for leadership in 2-cycle engines.

KIEKHAEFER CORPORATION • CEDARBURG, WISCONSIN

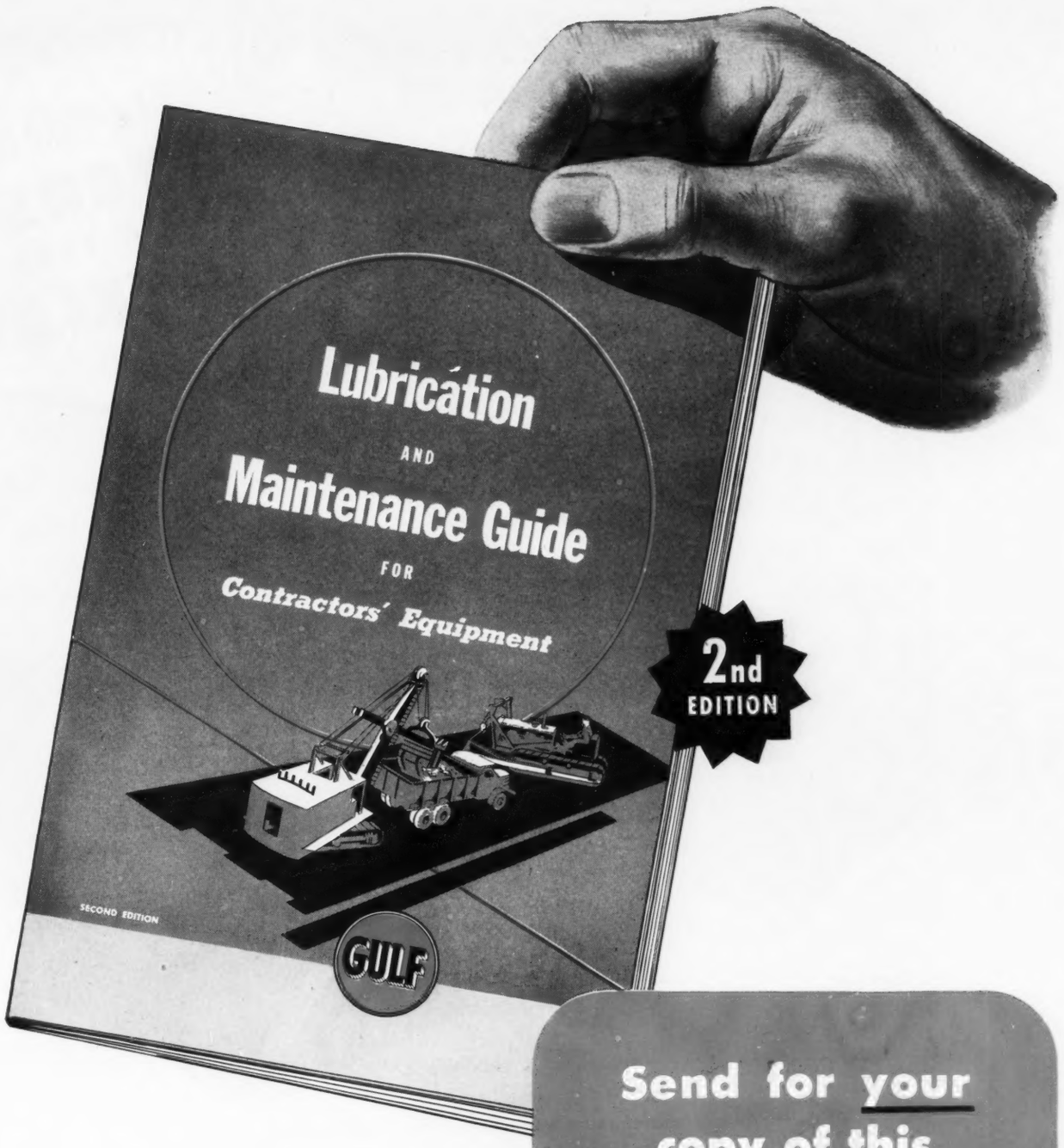
BUILDERS OF GASOLINE ENGINES EXCLUSIVELY

Buy more **WAR BONDS** *and keep them*

MERCURY

Outboard Motors • Marine Engines • Portable Industrial Engines • Aircraft Engines • Aircraft Auxiliary

Built to Use . . . . Built to Last



Send for your copy of this valuable book

64 PAGES OF UP-TO-DATE INFORMATION IN HANDY POCKET SIZE!

JUST OFF THE PRESS, the new revised edition of this popular Guide is chock-full of the latest facts on how to properly lubricate and maintain your vital mechanized equipment. It has been especially prepared by Gulf Lubrication Service Engineers with the sincere hope that it will prove helpful to you and your organization. It is easy to read and authentic in every detail. To get your copy of this useful book, just fill in the attached coupon.

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Please send me, without obligation, my free copy of the new revised edition of "Lubrication and Maintenance Guide for Contractors' Equipment."

Name.....
Company.....
Title.....
Address.....

HERE is a power shovel and crane with new, wide range Mobility because it is built on its own rubber tired all wheel drive "truck".

This rubber-tired chassis was specially engineered to provide a short coupled under-carriage that permits full circle shovel operation.

Thus, it is the first and foremost shovel that combines truck mobility *without sacrificing full circle 360° operating advantages.*

In addition, it is entirely operated by *one man,* who completely and easily controls all operations of traveling and operating. *No longer is it necessary for truck type excavators to have separate drivers and operators.*

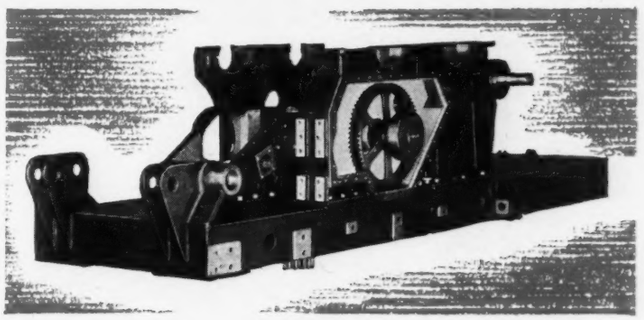
Byers "Traveler" is: first, a fast, smooth operating, powerful excavator with new economy features every shovel runner has wanted. It is: second, a self-propeller truck-type excavator that gets around as readily on the job as a truck and which travels at adequate truck speeds on the highway. It is: third, a tested, proved and approved unit for half-yard shovel jobs or ten ton crane jobs which contractors will be needing to meet today's competition for work.

If this is the type of excavator or crane you'd like to have, inquire for further details today.

TOMORROW'S SHOVEL IS HERE TODAY

OUTSTANDING FEATURES OF BYERS *HALF-YARD* TRAVELER

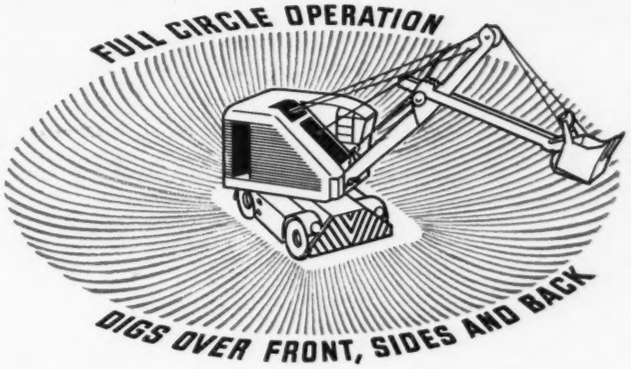
1. **Self Propelled** . . . around the job or on the highway.
   ELIMINATES TRAILER
2. **One man operated** . . . All controls conveniently grouped for operating or steering by the one operator.
   ELIMINATES SECOND MAN
3. **4-wheel drive** . . . 6 wheel traction, mud grip tires.
   SPECIALLY ENGINEERED CHASSIS
4. **Digs all around** . . . Over front, sides, back.
   A FULL CIRCLE MACHINE
5. **Air controls, hydraulic brakes.** Power steer.
   NOT AN "OLD" DESIGN MODERNIZED
6. **New, smooth "Airflex" cool internal expanding clutches.**
   FREE FROM ADJUSTMENT AND REPAIR
7. **Enclosed gears running in flowing oil.**
   EFFICIENT, CLEAN, LONG LIVED



BUILT LIKE A BATTLESHIP —STURDY FRAMES

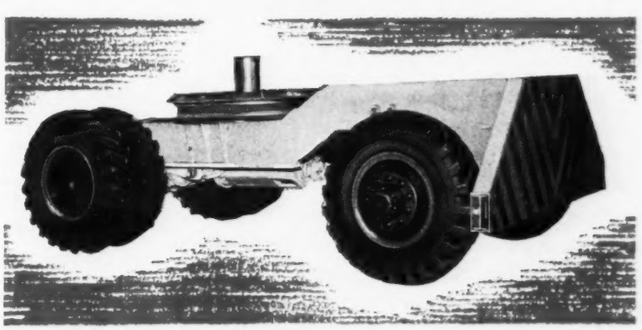
Because the chassis frame and main revolving frame of Byers "Traveler" was specially engineered for this particular excavator, the owner is assured of strong, rigid warp-proof construction. Capable of resisting twists and strains incident to traveling over rough ground, and shock loads of heavy digging, the "Traveler" combines maximum strength with minimum weight.

Basic construction of the "Traveler" has been proved rugged and dependable in actual service.



NEW SHOVELS AND CRANES WILL HAVE NEW, WIDE RANGE *MOBILITY*

because they will be built over a specially designed chassis like this . . . which overcome crawler handicaps and permits them to travel on the highway at adequate truck speeds.



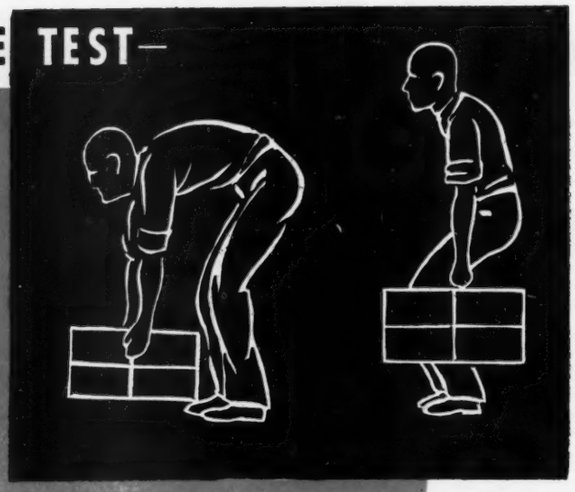
BYERS HALF YARD TRAVELER

THE BYERS MACHINE COMPANY • RAVENNA, OHIO

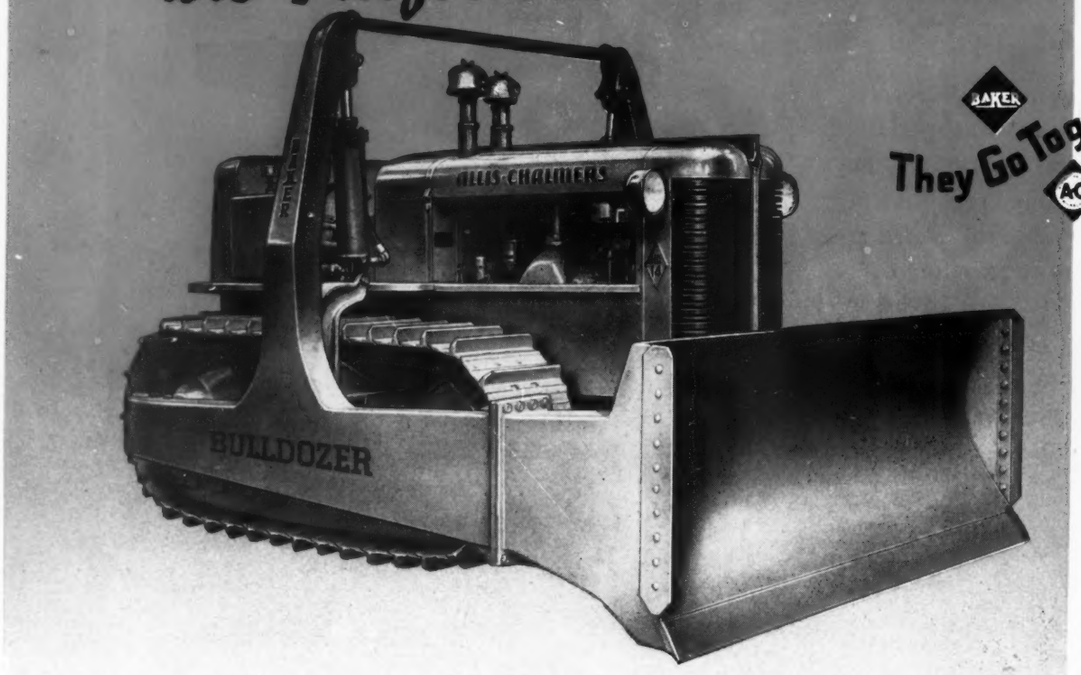
Distributors Throughout The World

RITE FOR THIS FREE ILLUSTRATED BOOKLET TODAY

• • • • MAKE THIS SIMPLE TEST—



see why BAKER *Hydraulic* BULLDOZERS *are Preferred!*



BAKER They Go Together AC

Place a suitcase or similar weighty object several feet in front of you. Bend over and pick it up at arms length. Puts a strain on the old back and gives the biceps a workout, doesn't it? Now place the suitcase at your side. Bend the knees, keeping your body erect, until you can grasp the suitcase handles. Comes up easy, doesn't it? You can lift a lot more this way, without straining your back, than you could at arms length.

Baker hydraulic Bulldozers operate on the same principle — the hydraulic cylinders work straight up and down, *direct and positive.* They lift the blade faster and can bring the full weight of the tractor front end to bear on the blade — no linkage lever losses — no "shooting around corners."

That's why Baker hydraulics outclass all comers for greater yardages per shift, lower operating costs and decidedly lower maintenance costs.

Keep your eye on the future. In the "sharp pencil" bidding to come after the war you will make greater profits with Bakers on your earth-moving jobs.

THE BAKER MFG CO.
568 Stanford Ave. Springfield, Ill.

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

"HERCULES" (Red-Strand) Wire Rope

Hercules of mythology has lived through the ages because of his ability to do the big jobs. His super-human strength and endurance made this possible—

"HERCULES" (Red-Strand) Wire Rope is also a "doer." Its qualifications, too, are the same. It not only has the strength to handle the big loads, but—and this is of *great* importance in wire rope usage—it also has the stamina and endurance to stand up under bending stresses and other gruelling conditions encountered in present day work.

For *consistent* top-flight performance you can rely on this modern "HERCULES". It is available in both Round Strand and Flattened Strand constructions, in either the Preformed or Non-Preformed type.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

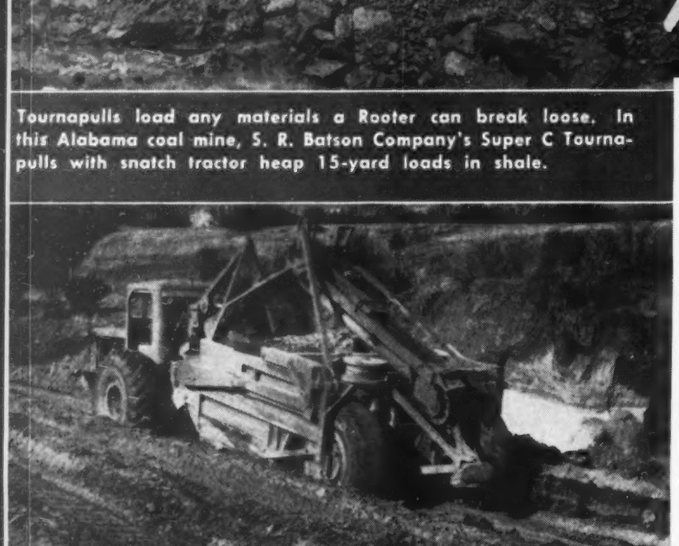
2909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

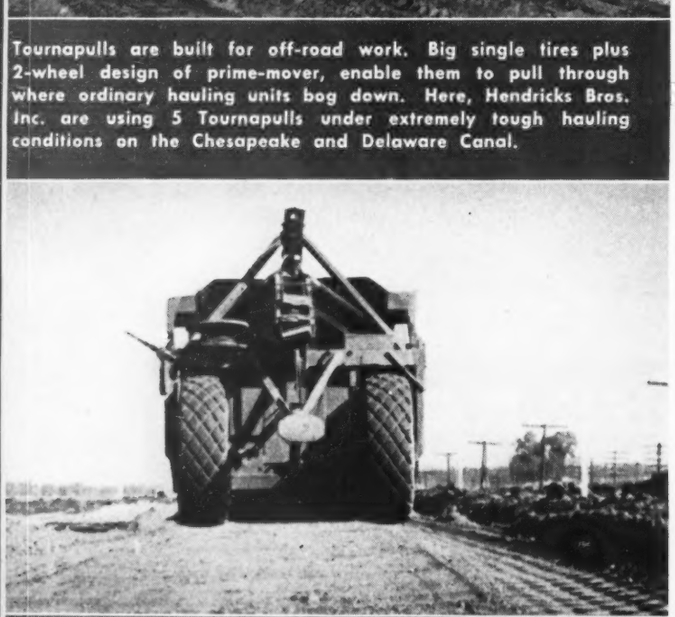
SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

TOURNAPULLS or SHOVEL & TRUCKS

Tournapulls load any materials a Rooter can break loose. In this Alabama coal mine, S. R. Batson Company's Super C Tournapulls with snatch tractor heap 15-yard loads in shale.



Tournapulls are built for off-road work. Big single tires plus 2-wheel design of prime-mover, enable them to pull through where ordinary hauling units bog down. Here, Hendricks Bros. Inc. are using 5 Tournapulls under extremely tough hauling conditions on the Chesapeake and Delaware Canal.



Tournapulls spread loads in even layers to accurate grades, provide fill compaction without using dozers or rollers. On this Illinois road job, Raemisch-Madden loaded, hauled and spread 47,000 cu. yds. of sub-base gravel in place with Tournapulls, eliminated need for trucks and spreader boxes. Haul: 3 miles one way.

IN ONE SIMPLE UNIT, Tournapulls combine both the loading functions of a shovel or dragline, plus the hauling functions of a truck, together with ability to spread and compact their loads to accurate grades on the fill.

SIMPLIFICATION MEANS LOWER COSTS

This simplification of operation eliminates a lot of expensive dead-weight and surplus horsepower, and reduces manpower requirements. Tournapulls also simplify job management because of fewer units and complications, including necessity for complete synchronization for efficiency in the interdependent shovel and truck combination.

COMPARE POWER AND WEIGHT REQUIREMENTS

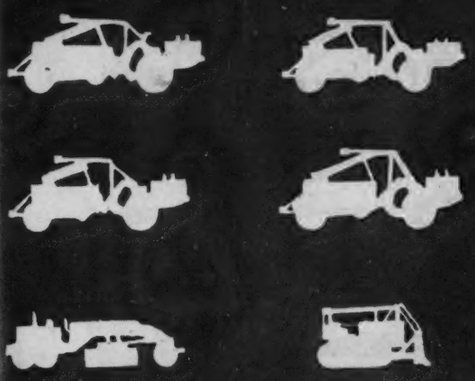
Study the chart on the opposite page. Then, set up a similar comparison on any job you are now planning. You will readily see why Tournapulls have proved their ability to beat shovel-truck costs on any jobs suitable for scraper loading. With modern developments in use of Rooters to break hard materials at large savings under drilling-and-blasting costs, you can count on Tournapull-Scrapers for the major percentage of your dirt-moving jobs.

STUDY TOURNAPULL FLEXIBILITY OF OPERATION

In addition to ability to move dirt at the lowest-net-cost-per-yard, Tournapulls offer further overall economies: (1) in their flexibility to work on any part of the job at any time without moving delay; (2) make job-to-job moves under their own power at considerable saving of time and money; (3) because

*On any jobs suitable for scraper loading

TOURNAPULL FLEET



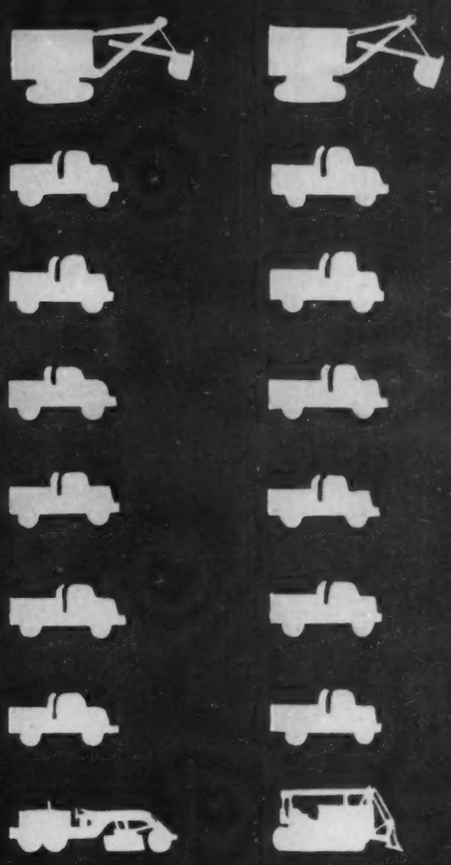
4 15-yard Tournapulls
1 113 hp snatch-tractor with dozer
1 motor patrol

6-man operating crew
788 operating horsepower
188,400 lbs. equipment

ONLY 38½% OF SHOVEL AND TRUCK EQUIPMENT INVESTMENT

Charts show a hypothetical example of equipment required to move 350 pay yards per hour on half-mile one-way haul in common excavation.

SHOVEL & TRUCK FLEET



2 1¾-yard shovels
12 7½-ton (6-yd.) trucks
1 75 hp tractor-dozer on dump
1 motor patrol

18-man operating crew
2250 operating horsepower
459,000 lbs. equipment

OVER 2½ TIMES TOURNAPULL FLEET EQUIPMENT INVESTMENT

of big tires (5'6" diameter) and weight distribution, they go through where trucks can't go, operate in wet weather when trucks shut down.

INVESTIGATE TOURNAPULL CLAIMS

Before you buy any additional dirtmoving equipment, be sure to check your job estimates against Tournapull costs. Your LeTourneau distributor will be glad to give you every assistance in setting up these figures and showing you how to check and prove them to your own satisfaction. Investigate Tournapull lowest-net-cost-per-yard claims NOW. It's vitally important to your planing and profits.

Tournapulls haul over pavement without interrupting traffic. Leonard & Slate have 8 Tournapulls on this Portland to Seattle Route 99 realignment job where they are moving 600,000 yards of earth and rock, with hauls to one-half mile over existing pavement.

C28A

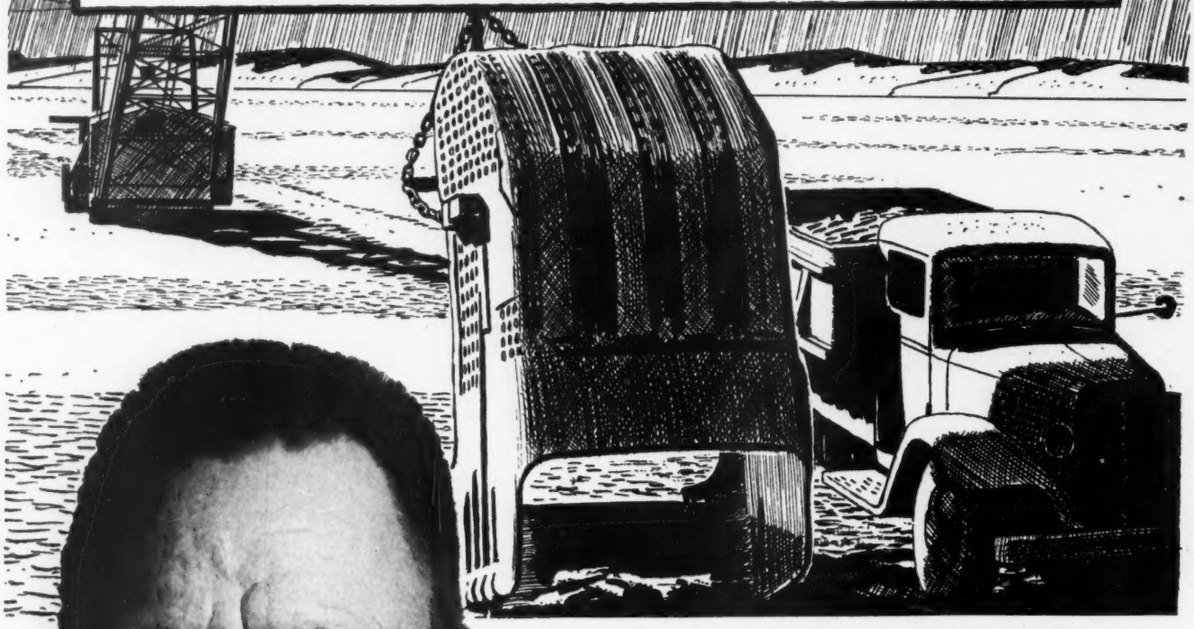
LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 3400 Built and Shipped

TOURNAPULLS*

*Trade Mark Reg. U. S. Pat. Off.

"...have used nothing else for 10 years"



FROM LOUISIANA

EDWARD SWAN; General Manager
Walter P. Villere, General Contractor
New Orleans, Louisiana

One of a series of testimonial letters received from all parts of the United States

"...our company uses in the construction business one of the largest draglines in the South, a Walking Monagan, capable of handling 10 cubic yards of dirt at a time.

...machine which is now working on an emergency levee building job on the Mississippi River at Baton Rouge, is powered by a Fairbanks Diesel motor.

...as you know, a Diesel motor operates faster, and under increased pressure of heat, ordinary oils form carbons and plug up piston rings...power and compression are cut to an alarming extent.

...ten years ago Macmillan Ring-Free Motor Oil was recommended as a solution to the problem of keeping machine in prime working order...we have used nothing else since.

...having been around machinery all my life, have yet to see any other motor oil accomplish in both Diesel and gasoline motors what Macmillan Ring-Free can do."

Excerpts of letter from– Edmund Swan

Other equipment operated by Villere Company: two P. H. Shovels, 1¼ yard capacity with Waukesha motors; four 1½-Ton Ford Trucks, one 1½-Ton International, one 1-Ton Diamond T; 1940 Imperial Chrysler, 1942 Oldsmobile, 1936 Chrysler, 1941 Plymouth. On Macmillan Ring-Free, of course!

MACMILLAN RING-FREE MOTOR OIL

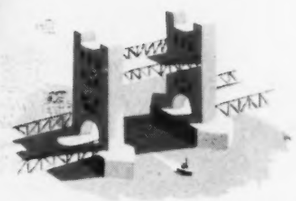
Operators of all types of equipment report lower-cost, more efficient performance with Macmillan Ring-Free Motor Oil. Find out how it can help lick your toughest lubrication problems... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

50 W. 50th Street, New York 20 • 624 So. Michigan Avenue, Chicago 5 • 530 W. Sixth Street, Los Angeles 14 • Copyright 1945, Macmillan Petroleum Corporation

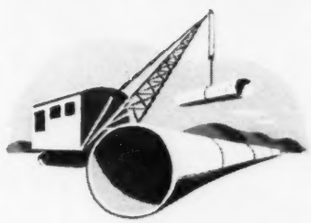
UNUSUAL STEEL JOBS HANDLED QUICKLY, CAPABLY

Here are examples of the unusual and specialized steel jobs that Consolidated Steel Corporation is prepared to help plan and fabricate for you *now*.



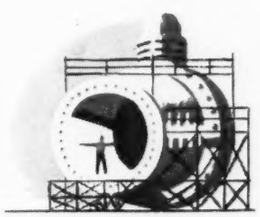
BRIDGES

INDUSTRIAL BUILDINGS



PIPE LINES

PETROLEUM EQUIPMENT



LARGE VALVES

TRANSMISSION TOWERS

TANKS

For precision steel fabrication–handled quickly and capably–call in Consolidated Steel Corporation, 5700 South Eastern Avenue, Los Angeles 22, Calif. Other plants at Long Beach, Wilmington, Newport Beach, Calif.; Orange, Texas.

Largest Independent in the West

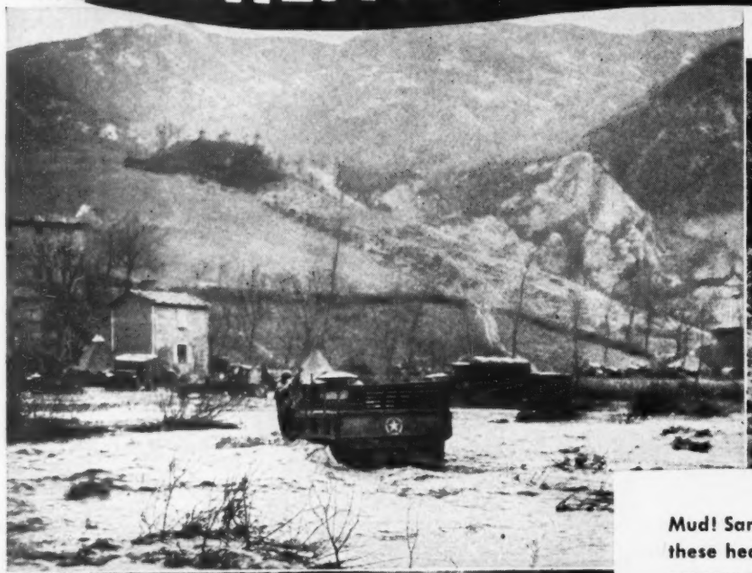
Consolidated Steel

FABRICATORS
ENGINEERS
CRAFTSMEN

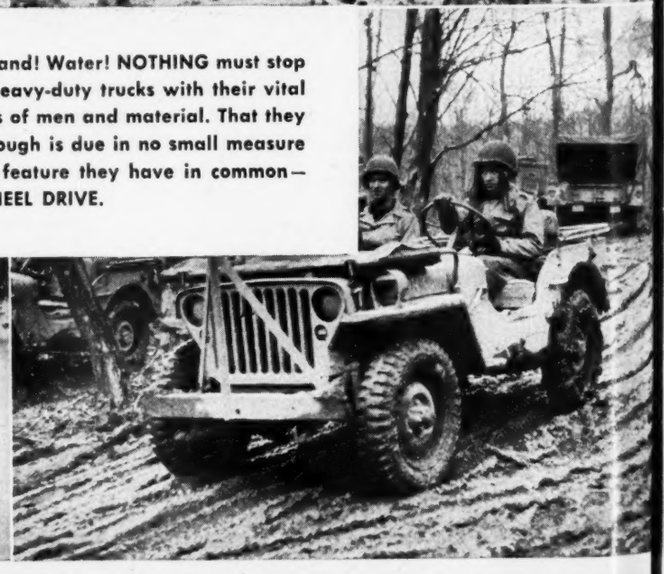
Rx all-wheel drive

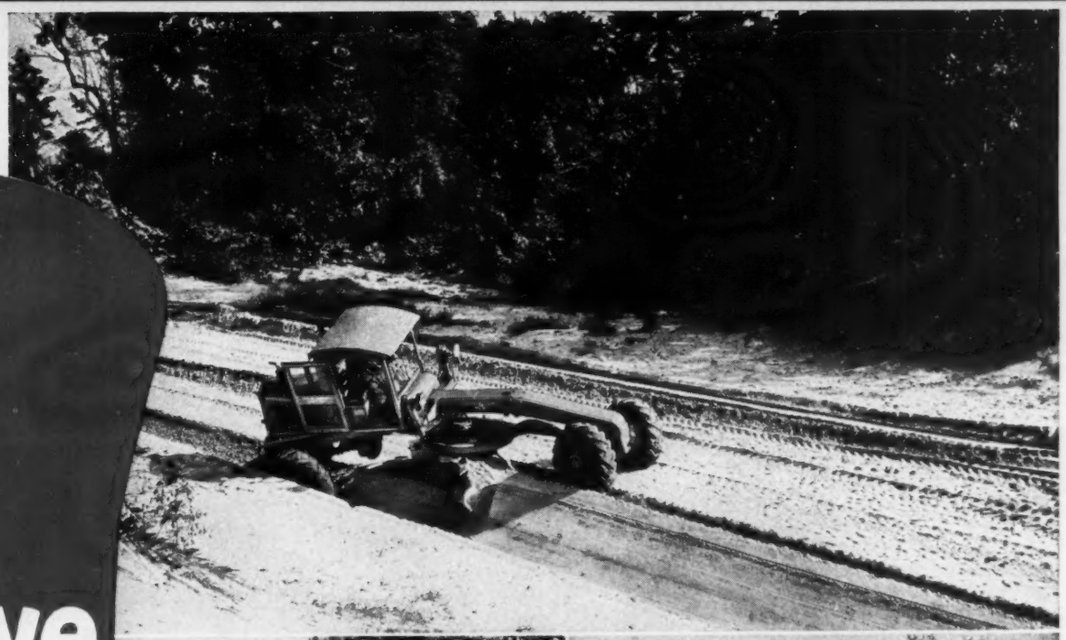
Maximum Effort . . .

in MILITARY VEHICLES



Mud! Sand! Water! NOTHING must stop these heavy-duty trucks with their vital cargoes of men and material. That they get through is due in no small measure to one feature they have in common—ALL-WHEEL DRIVE.

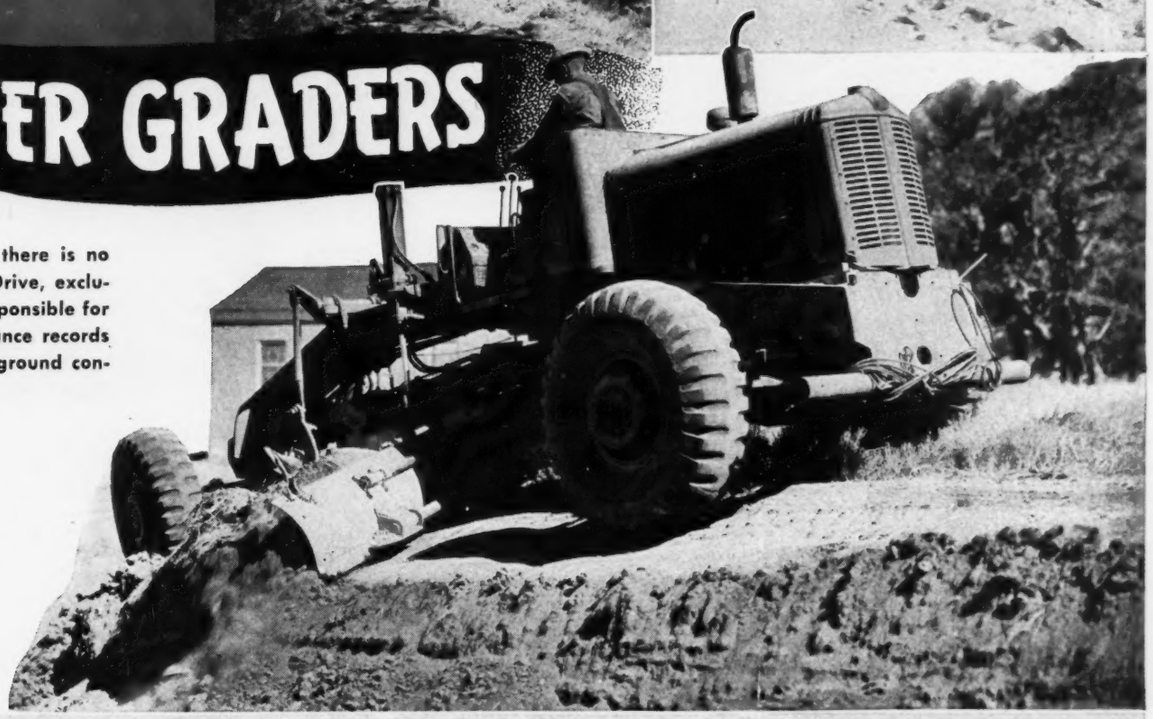




for Tractive . . . .

in POWER GRADERS

In Power Graders, too, there is no substitute for All-Whel Drive, exclusive in the 99-M, and responsible for its outstanding performance records under the most difficult ground conditions.



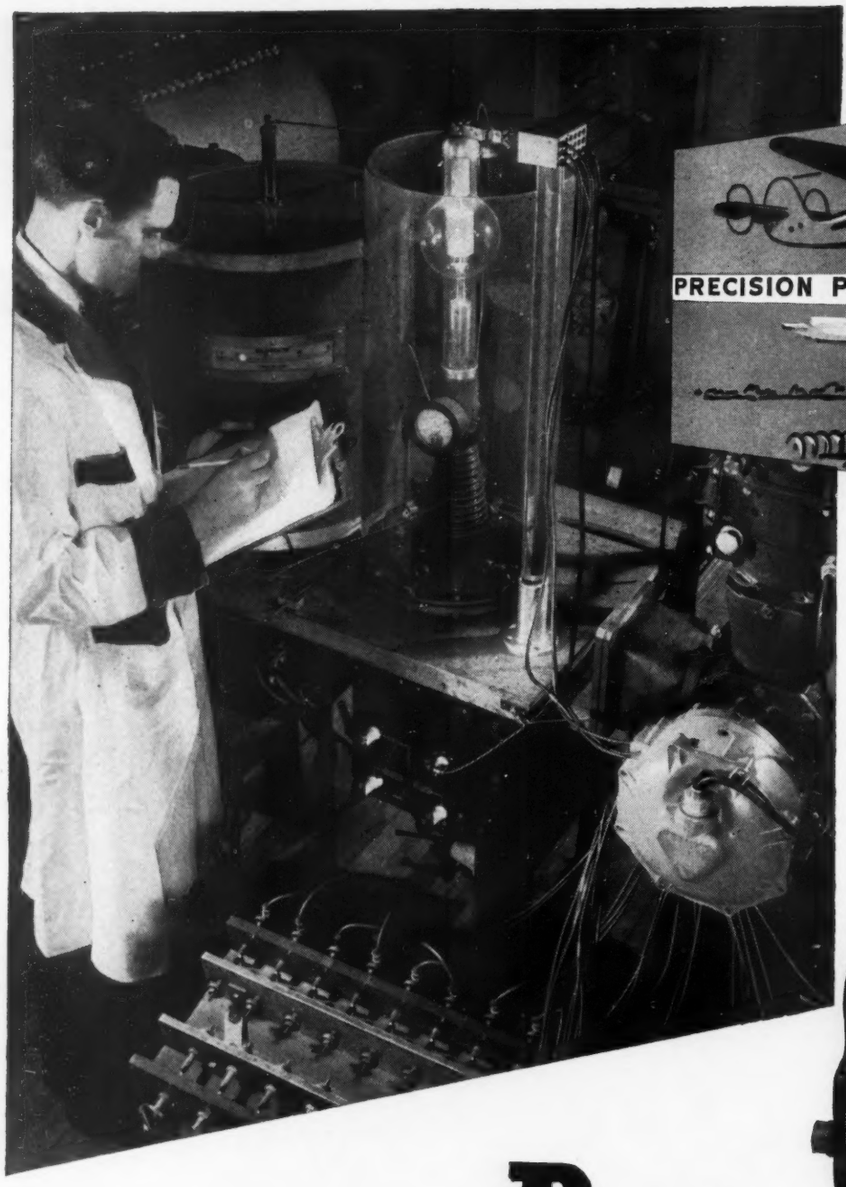
BUILDERS OF ROAD MACHINERY

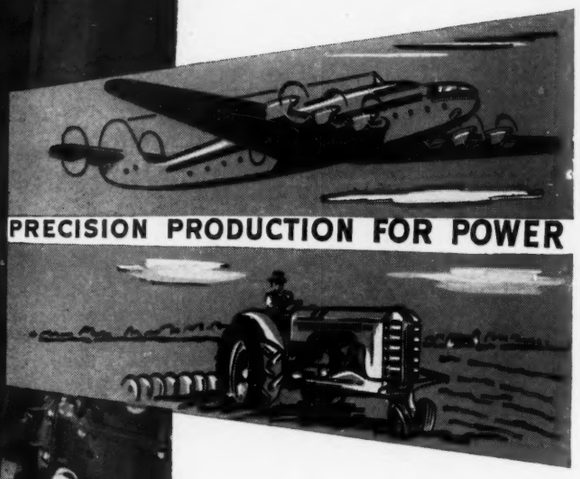
Austin Western

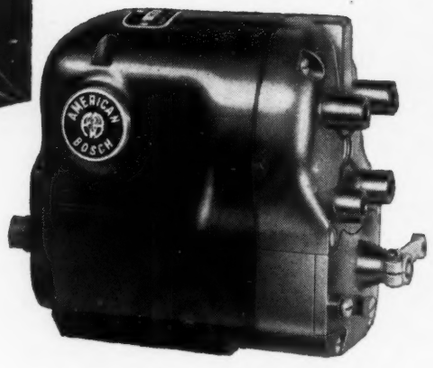
SINCE 1859

BUY MORE WAR BONDS

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.







Taking the pulse of Power

American Bosch Magnetos are serving with distinction on many great allied war planes and in more than 25 other military applications. *They are now available* for essential domestic use.

Will your magneto supply your engine with its full ignition requirements? If it is an American Bosch, it *will* . . . because American Bosch makes sure of it.

In this laboratory scene, a technician is giving the magneto its voltage output test. A 75,000-volt rectifier tube and a high-precision voltmeter are literally taking the pulse of power . . . making sure that the magneto meets maximum voltage requirements with a power *plus*.

This is just one of many examples of Precision Production for Power – your assurance of dependability through years of service.

AMERICAN BOSCH CORPORATION
Springfield 7, Massachusetts

AUTOMOTIVE AND AVIATION ELECTRICAL PRODUCTS • FUEL INJECTION EQUIPMENT

PROGRESS *starts with Excavation*

Excavating to help build a way of life . . . excavating to help destroy an enemy . . . the purpose and the operating environment are different — but the basic operations are the same. A road, for example, whether it carries the products of peacetime or the ordnance for offensives, is still a road. The same amount of dirt must be moved to build it!

This new free 36-page booklet gives you the dramatic picture story of excavating in war and peace. It shows you, too, why the more than 3000 fighting Bucyrus-Erie excavators, as their peacetime counterparts have done yesterday and will do tomorrow, perform with an efficiency that makes them truly fundamental tools for progress.

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

Write for your free copy today!

25E45

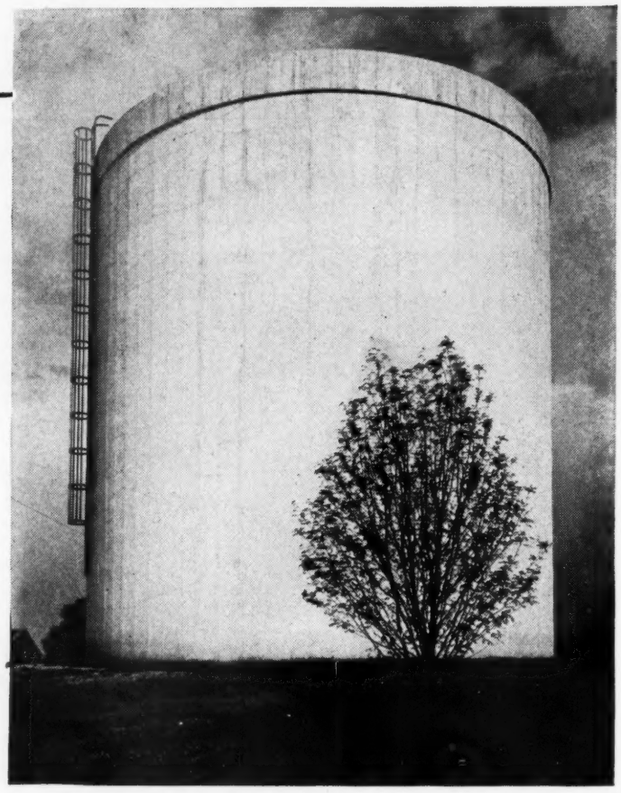
ATLAS DURAPLASTIC

Air-Entraining Portland Cement

Makes better concrete at no extra cost...

- ▶ A new stride in cement and concrete;
- ▶ Based on a decade of research and development;
- ▶ Six years of convincing field performance;
- ▶ Complies with ASTM specifications;
- ▶ Calls for no additional materials;
- ▶ Sells at same price as regular cement;
- ▶ Fortifies concrete against the effects of freezing and thawing;
- ▶ Resists pavement scaling;
- ▶ Used with gratifying success since 1939 for foundations, sidewalks, paving, tanks, retaining walls, houses and flooring!

SEND FOR DURAPLASTIC BOOKLET. Write to Technical Service Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.



St. Charles, Mo., 1,000,000-gal. water tower *built with concrete made with Duraplastic cement, supplied by Fred Schmitt Material Co., St. Louis. Wm. S. Hewitt, engineer, Chicago; J. J. Wuellner & Son, contractor, Alton, Ill.*

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

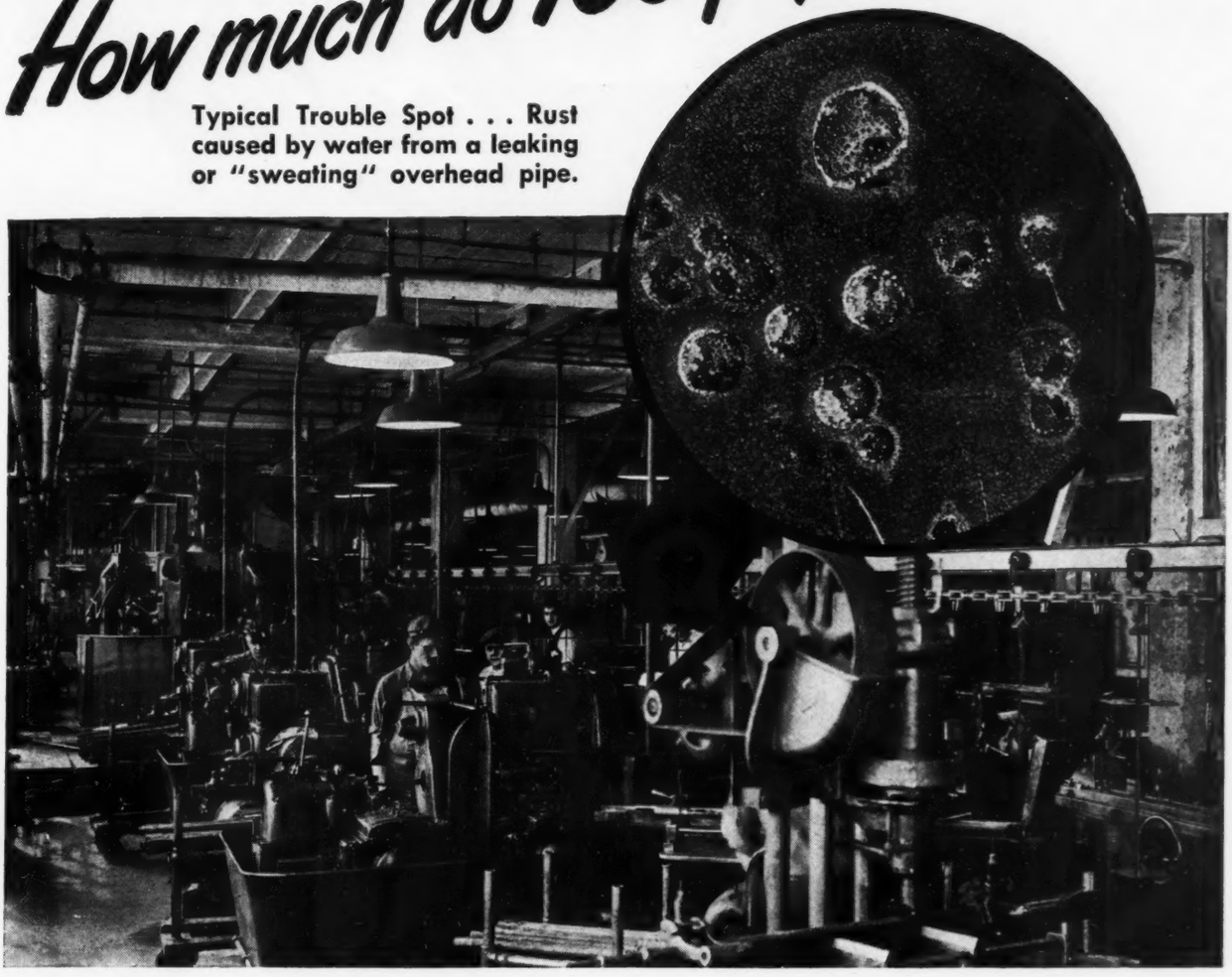
ATLAS DURAPLASTIC TRADE MARK REG. U. A. C. CO.

CM-D-15

The Air-Entraining Portland Cement That Makes Concrete More Durable and More Plastic

How much do YOU pay for Rust?

Typical Trouble Spot . . . Rust caused by water from a leaking or "sweating" overhead pipe.



$100,000,000—that's just a conservative estimate of the annual losses caused by rust . . . *how much is your share?*

Precautionary measures can minimize or completely eliminate rust destruction—save you money and production headaches.

Cities Service Rust Remover is an unexcelled first-step in plant-protection. This fast-acting liquid dissolves rust from iron or steel and removes tarnish from aluminum, brass, copper and other non-ferrous metals. It's simple to apply and easy to remove.

After cleaning, your Cities Service engineer will show you how to protect and preserve the cleaned metal surfaces with a special coating of one of our exclusive Anti-Corrodes.

Cities Service will be glad to study your plant operations and recommend a suitable rust-prevention program without obligation on your part.

You may avoid considerable trouble and expense. Consult a Cities Service expert today.

CITIES SERVICE OILS
ONCE-ALWAYS

MAIL THIS COUPON TODAY!

Cities Service Oil Company
Room 377, 70 Pine Street, New York 5, N. Y.

Gentlemen: I am interested in your Rust Prevention Program. Please contact me.

Name.....

Title.....

Company.....

Address.....

City.....State.....

SOUTHWEST Hauling Scoop

SINGLE CABLE CONTROL

Here it is—the first rear dump hauling scoop with *single cable control!* No longer is it necessary to have hydraulic equipment to have a rear dump unit. Southwest does it with the single cable control. And here are some of the advantages: Dumps safely over embankments—Works well in difficult places—Dumps while moving forward, backward or standing still—Shortens operational cycles by *controlled* spreading. Sturdy design and construction to handle tough jobs easily. Ideal for road maintenance and repair.

Four page bulletin available on request. Gives engineering data on the three standard sizes of Southwest Hauling Scoops. Write Department A130 Southwest Welding & Manufacturing Company, Alhambra, California.

The Southwest Single Cable Control Scoop can be operated by a single drum or as a "dozer scoop" combination with double drum unit.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

WINCHES BULLDOZERS CRANES TANKS DUMP WAGONS RIPPERS TAMPERS SCRAPERS

BUILD THE POSTWAR ROAD

The Bethlehem Way

When the great postwar highway program gets under way—when the roadbuilding army of perhaps 7,000,000 men is on the march—there's going to be plenty of work for engineers and contractors to do. Including lots of paper work.

Why not lighten your paper burden by planning to order all your steel needs for a road job from Bethlehem? A telephone call to a nearby Bethlehem district office or warehouse is all that's necessary to get a complete road-steel order co-ordinated and moving fast. And Bethlehem supplies every one of the steel products needed to build a modern concrete highway or street, or a highway bridge of any type.

Bethlehem highway products are engineered and built for rugged, lasting service. They'll carry you along the road job, from the time the Bethlehem hollow drill bites into solid rock until the last section of guard rail is in place.

For full information, get in touch with the nearest Bethlehem district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM PRODUCTS FOR HIGHWAYS

ROAD JOINTS DOWELS DOWEL BAR SUPPORTS CENTER STRIP
WIRE ROPE AND STRAND BAR MATS BAR TIES
BEAM AND CABLE-TYPE GUARD RAILS HIGHWAY GUARD POSTS AND BRACKETS
ANCHOR RODS RIGHT-OF-WAY FENCE AND POSTS PIPE HOLLOW DRILL STEEL
DIGGING BARS STRUCTURAL STEEL MOLD BOARDS BRIDGE FLOOR REINFORCING
CORRUGATED SHEETS CONCRETE SLAB SPACERS TURNBUCKLES
TIE RODS, SPIKES, BOLTS AND NUTS TIMBER BRIDGE HARDWARE
SHEET AND H-BEARING PILING

BETHLEHEM STEEL

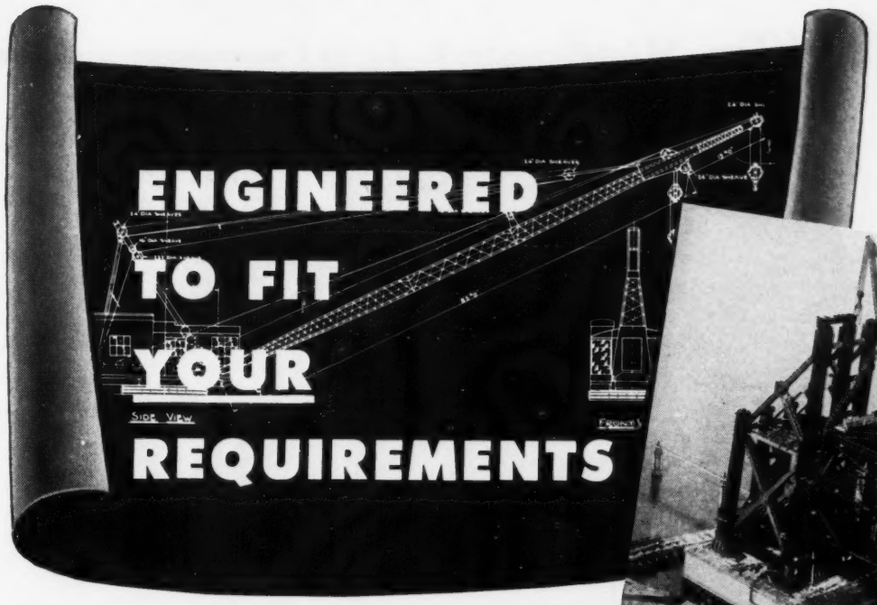
CLEVELANDS . . . Modern, dependable, rugged and fast—represent the highest development in the full-crawler, wheel type trencher, pioneered by "Cleveland" more than twenty years ago.

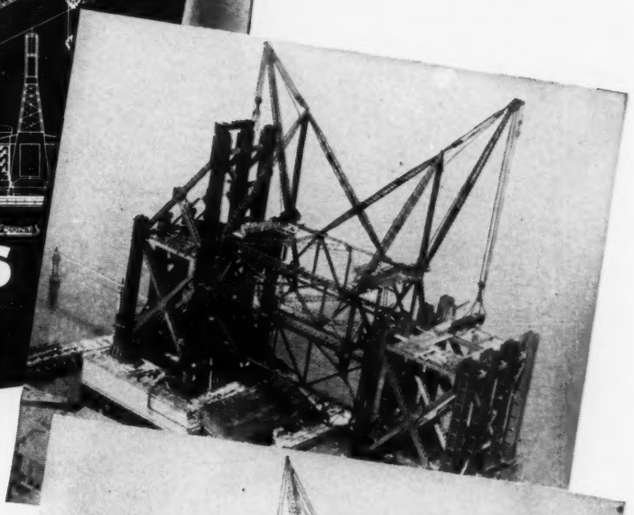
A wide range and combination of digging and travel speeds, ample power for the toughest going in all kinds of soil and terrain, ease of handling, low fuel and operating costs and minimum times out for repairs, are some of the many practical advantages characteristic of Clevelands that assure you most completed trench at least cost on all your trenching jobs.

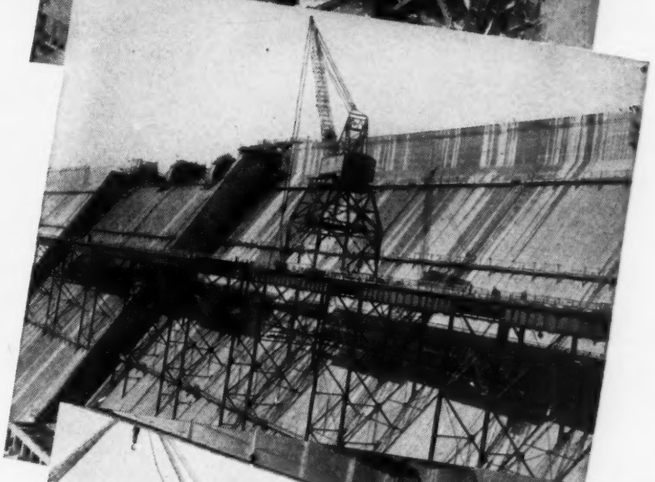
THE CLEVELAND TRENCHER COMPANY

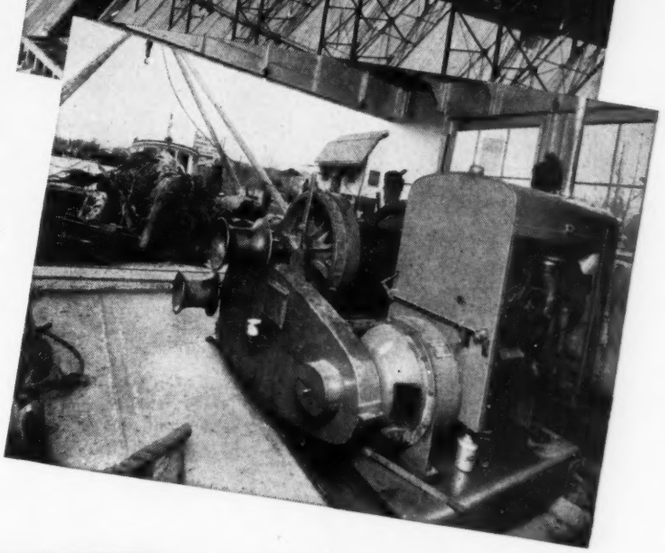
20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO

"CLEVELANDS" Save More . . . Because They Do More





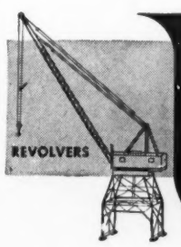




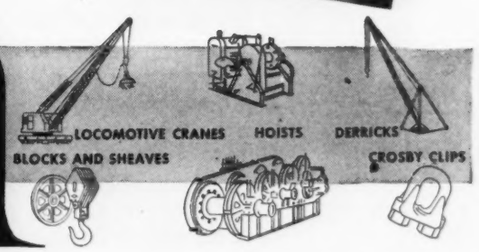
"AMERICAN" EQUIPMENT is designed to fit ALL the particular requirements of the project for which it is purchased—and to be highly adaptable to other jobs of the type handled by the contractor. Comfortable, full-vision "American" control cabs and finger tip air controls eliminate operator fatigue and facilitate faster and steadier operation.

Because mechanized materials handling is such an extremely important part of all construction, plan your jobs with "American." Take an "American" expert with you to the project site. Discuss every detail with him . . . his suggestions, backed by years of experience, will pay you well.

He can help you arrive at accurate cost estimates and work schedules on which to base your quotations. Use of this service does not obligate you in any manner. Write, wire or phone us whenever we can be of help to you.



AMERICAN
HOIST & DERRICK CO.
St. Paul 1, Minnesota
CHICAGO · SAN FRANCISCO · NEW YORK



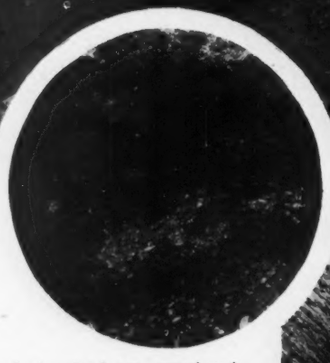
A Griffin Wellpoint Job!

DRY GROUND WAS FIRST STRIPPED TO WATER LEVEL

BEFORE

THEN GRIFFIN PUT DOWN WELLPOINTS

5 Times Faster



Mixed clay, hard pan, gravel and boulders penetrated by GRIFFIN JET'N METHOD

AFTER

GROUND WATER WAS HELD 15 FEET BELOW ORIGINAL LEVEL (above) WITH ALL BANKS SLOPED

A well drilling outfit was first used to install mesh covered wellpoints—and could put down only 4 wellpoints to a depth of 20 feet in 3 days. The contractor THEN used the Griffin JET'N METHOD and averaged 20 wellpoints per day without a well drilling outfit. Think of the SAVING made by using the GRIFFIN SYSTEM. Moral: Buy or Rent Griffin Wellpoints in the first place.

FOR SALE

MID-WEST

GRIFFIN EQUIPMENT CO., INC.
548 Indiana Street • Hammond 1662
HAMMOND, INDIANA

SOUTH

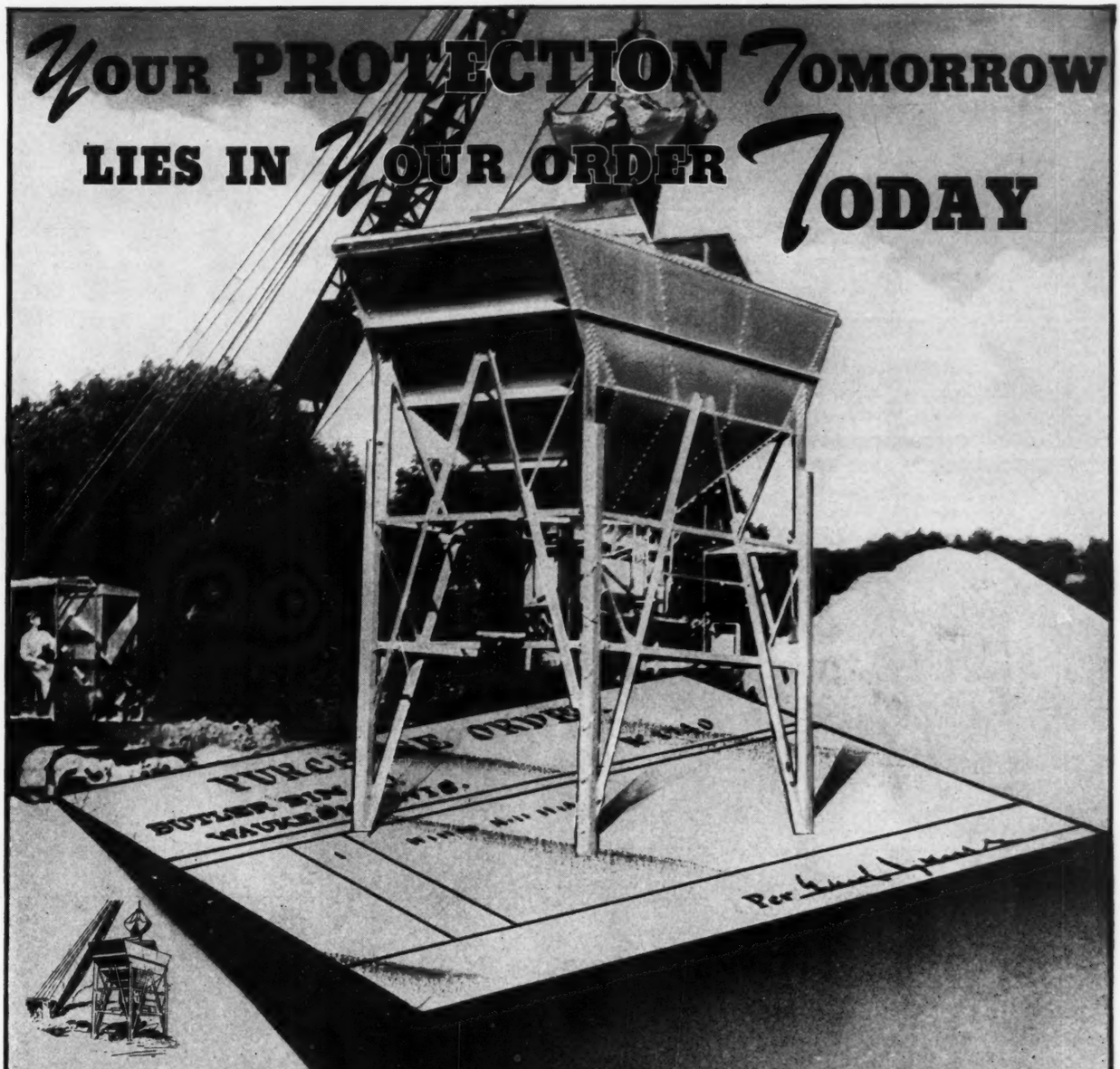
GRIFFIN ENGINEERING CORP.
2016 E. Adams St. • Jack'ville 5-4516
JACKSONVILLE 2, FLA.

FOR RENT

MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N. Y.

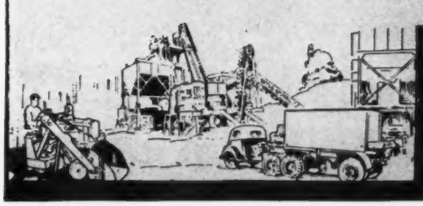
GRIFFIN WELLPOINT CORPORATION

YOUR PROTECTION TOMORROW LIES IN YOUR ORDER TODAY

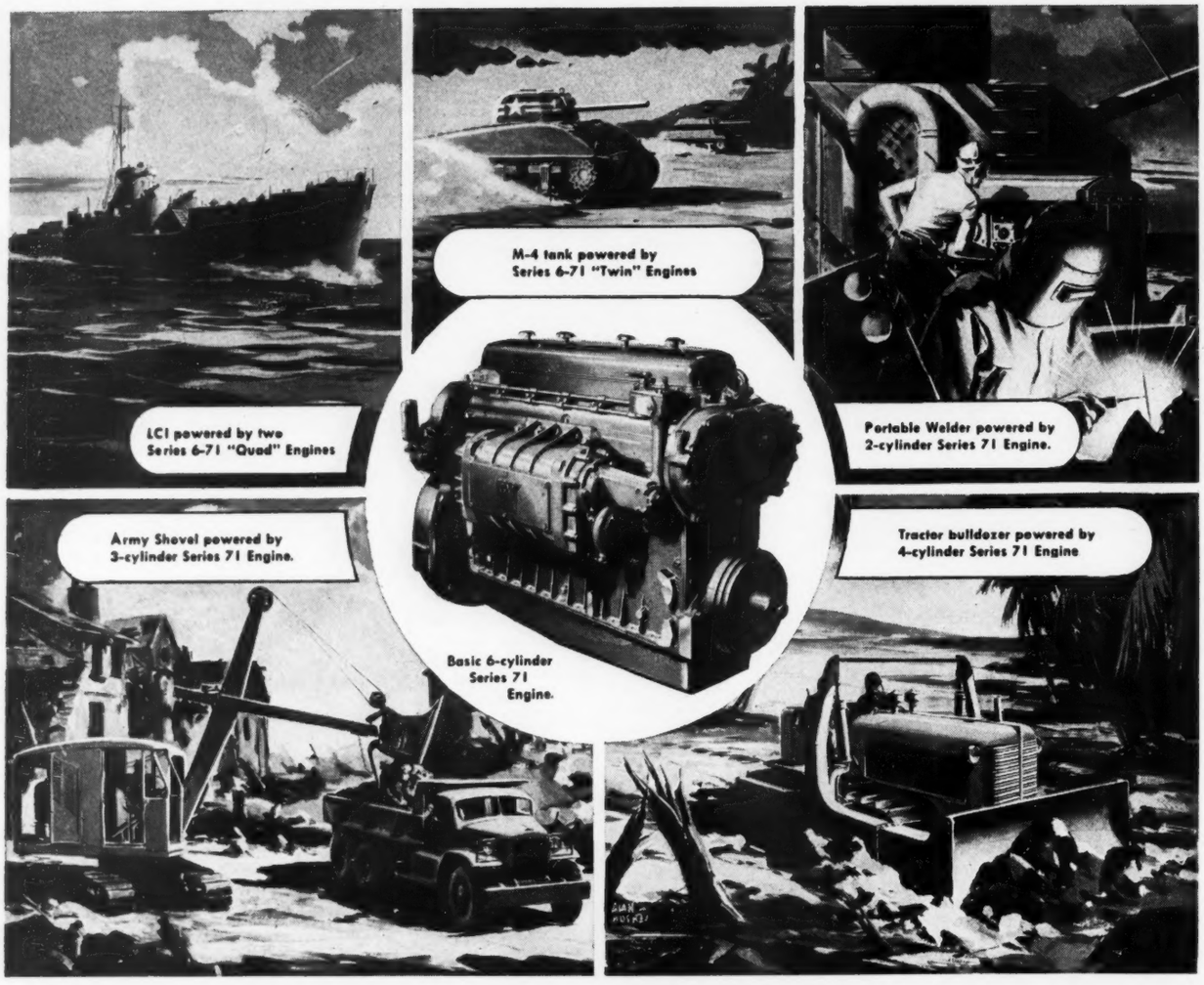


Stop and analyze now, your future equipment requirements. Analyze in the light of two imperative factors. First, — highway reconstruction alone, to say nothing of the vast new highway programs, involve an equipment demand that will require as much effort on the part of manufacturers as ever did the demands of war. Second, — time schedules, competition and the magnitude of the task will require equipment engineered to the utmost in capacities and production.

For these reasons, sound, far sighted policy dictates that, — to be assured that the most modern equipment (the finest in high production Engineered Design will be on your jobs when you want them) — your order should be placed now for future delivery—and, of course, placed with Butler.



BUTLER
BIN COMPANY
WAUKESHA, WISCONSIN


LCI powered by two Series 6-71 "Quad" Engines
M-4 tank powered by Series 6-71 "Twin" Engines
Portable Welder powered by 2-cylinder Series 71 Engine.
Army Shovel powered by 3-cylinder Series 71 Engine.
Basic 6-cylinder Series 71 Engine.
Tractor bulldozer powered by 4-cylinder Series 71 Engine

THERE WHEN NEEDED

In addition to providing plenty of dependable power for the machines our fighting men use, this engine, because of its interchangeable parts, helps them keep everything on the move.

For example, a shell-torn shovel or tractor engine can be fixed with an engine part from a wrecked landing craft. A landing craft can keep going by picking up a part it needs from a disabled tank.

Every GM Series 71 engine, whether a two-cylinder or one of a "Quad" six, has the same bore and stroke, and most moving parts from one engine will fit and work perfectly in any other.

This feature of interchangeability of parts in these engines will be equally important in peacetime. The elimination of *different* sizes of parallel parts increases the availability to owners of the right part *when it is needed.*

In construction, fishing, transportation and all through industry, these "Single", "Twin" or "Quad" GM Diesels will provide dependable, low-cost and *easily maintained power.*

KEEP AMERICA STRONG
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

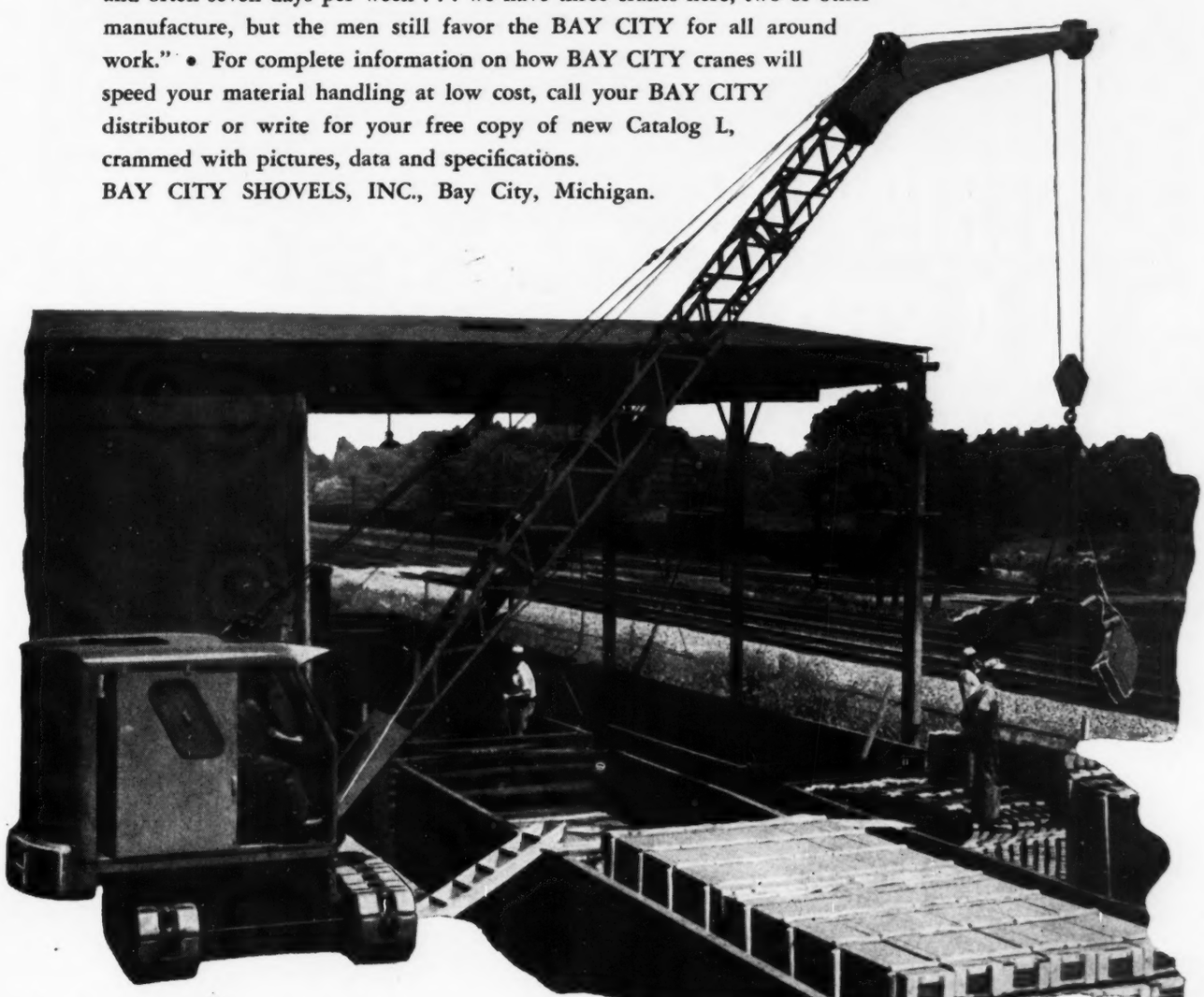
SINGLE ENGINES . . Up to 200 H.P.
MULTIPLE UNITS . . Up to 800 H.P. } . . **DETROIT DIESEL ENGINE DIVISION,** Detroit 23, Mich.

ENGINES . . 150 to 2000 H. P. . . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

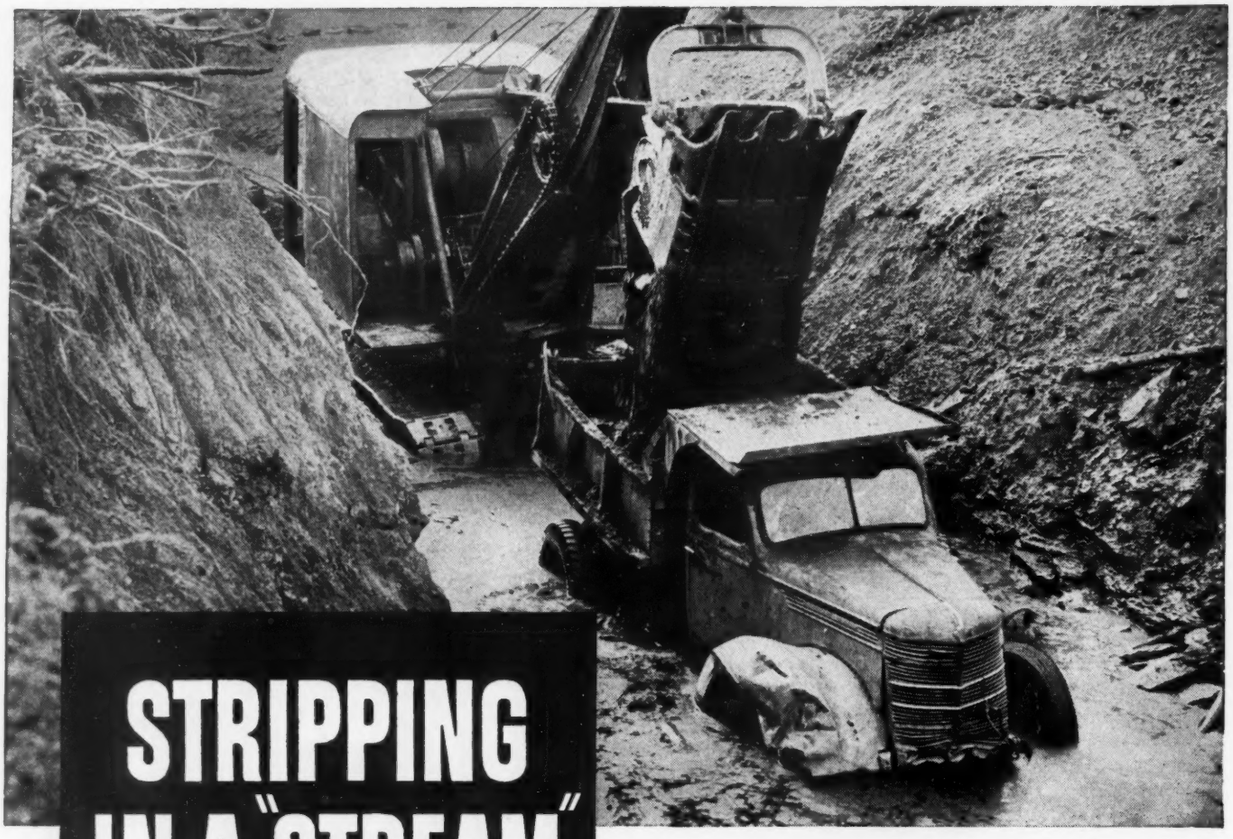
Handy SPEEDY STRONG MAN • ALWAYS ON THE JOB! BAY CITY CRAWLER CRANES GET THINGS MOVED IN A HURRY!

Fast, maneuverable, rugged, easy-to-operate—that's why BAY CITY crawler cranes are on the job day in and day out in scores of busy yards and terminals throughout the country. Photograph illustrates the nicely balanced 5 ton crane with gooseneck working for Stran Steel Division, Great Lakes Steel Corp., loading cars with Stran-Steel, the magic material of the famous Quonset Hut for the navy. Mr. R. L. Kretschmar, Plant Manager at the steel company's Mansfield, Ohio, plant writes in part ". . . we have used this machine twenty to twenty-two hours per day for six and often seven days per week . . . we have three cranes here, two of other manufacture, but the men still favor the BAY CITY for all around work." • For complete information on how BAY CITY cranes will speed your material handling at low cost, call your BAY CITY distributor or write for your free copy of new Catalog L, crammed with pictures, data and specifications.
BAY CITY SHOVELS, INC., Bay City, Michigan.



BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH HOES

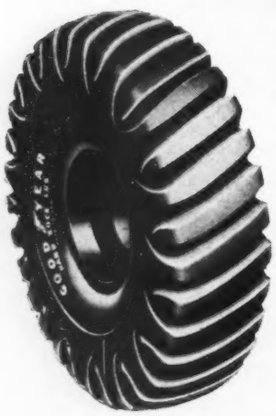


STRIPPING IN A "STREAM"

—but these tires keep loads moving!

HERE'S where work-tires take a daily bath and beating — and come back for more.

On the Wade and Richey Company's coal-stripping job in Alabama, seven trucks like the one above — all equipped with Goodyear Hard Rock Lug tires — haul away the coal. But a perverse creek nearby puts much of the area under several feet of water. So loads must be pulled through sticky mud and slime — often over submerged and murderous rocks, shale, sharp stones.



Yet these Goodyears — all veterans of many months of rough and rugged service at various ore and quarry operations before their transfer here — are delivering top-notch performance on this tire-killing job because they're built tough for tough going, have the stamina to take long punishment.

The other Goodyear off-the-road tires, too, are job-proved, high-hour performers — the great Sure-Grip with *open center* tread for drive wheels where traction counts most, and the time-proved All-Weather Earth Mover for drawn vehicles where easy rolling is a must.

And because these tough work tires consistently deliver lower costs-per-ton-mile, more and more contractors now buy Goodyears for their units. Chances are you will, too, once you get the story from men now using them.

Sure-Grip, All-Weather—T.M.'s The Goodyear T. & R. Co.

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 27 — AUGUST, 1945 — Number 8

Captured Nazi War Goods

SUPPLY ARMIES OF OCCUPATION

TREMENDOUS SAVINGS in money, manpower, and shipping space are being realized by diverting to the use of our armies millions of tons of critical war materials captured from the Nazis in the rich industrial Rhineland and Saar Valley sectors of Germany.

In the Saar Valley, special Engineer units are working an area of 2,000 sq. mi. which has yielded tens of thousands of tons of vital war materials, such as prefabricated steel truss bridges, locomotives and box cars, trucks, automobiles, road graders, hand tools, batteries, generators, large tractors, and boats with outboard motors. In addition, huge stockpiles of

(Continued on page 172)

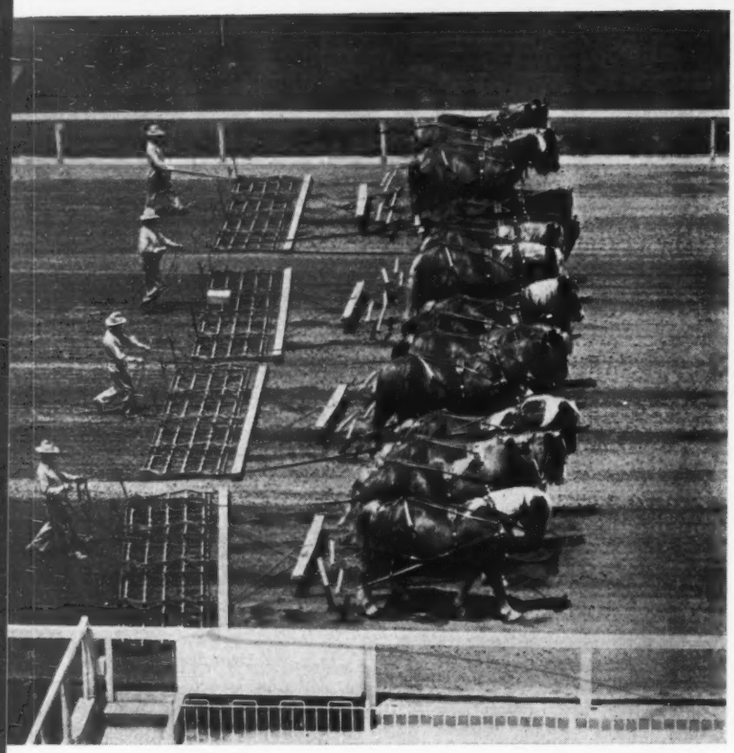
STEEL RAILS for use by Army Engineers in rebuilding bombed-out railroads near Darmstadt, Germany, are unloaded from railway flat cars by German civilians employed by U.S. Army. Signal Corps Photo

Page 61

PREFABRICATED BRIDGE TRUSSES, produced in Germany and used by U.S. Army Engineers in constructing bridge at Heidelberg save transporting heavier I-beams.

$450 MILLION PLANT (below) of I. G. Farben at Ludwigshafen, Germany, is now under requisition of U.S. Army. Although buildings are 65 percent destroyed, it is estimated that 70 percent of plant's machinery can be made useful. Bomb damage to marshalling yards can be seen in foreground of photograph. Factories in background are already producing oxygen for U.S. Army.

THIS MONTH'S NEWS REEL

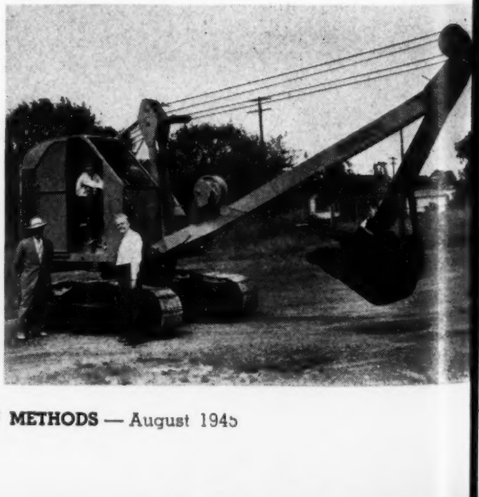


SANTA ANITA RACE TRACK is curried by 16 matched Belgian horses. Draft horses are carefully chosen for appearance to pull track drags before daily races at Arcadia, Calif.

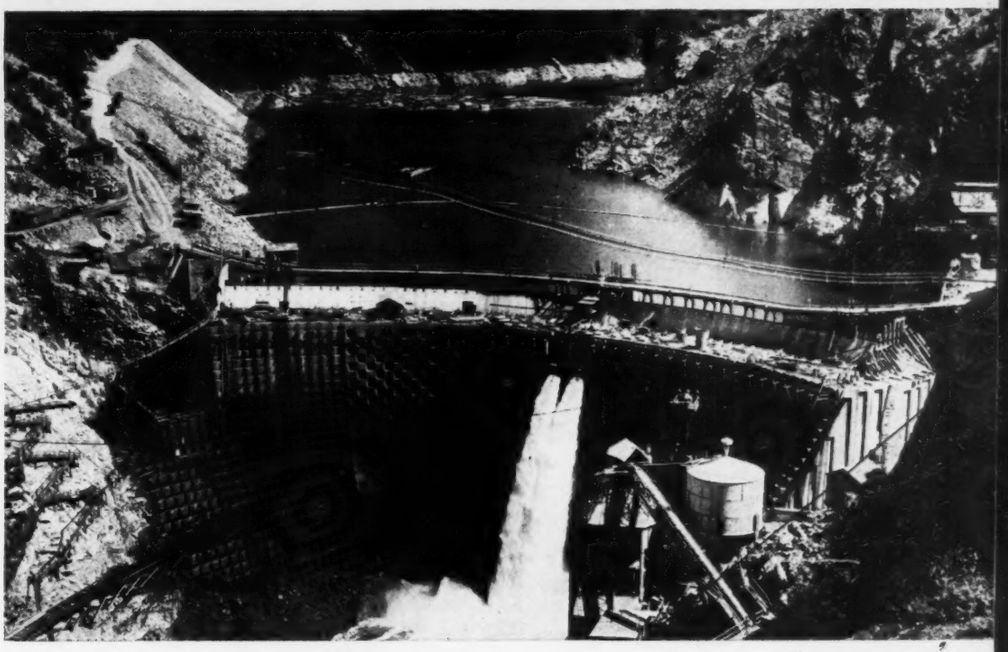
Wide World Photo

ARMY ENGINEERS CELEBRATE 170th anniversary at home and overseas. LIEUT. GEN. EUGENE REYBOLD (left), Chief of Engineers, cuts birthday cake in Washington, D. C., watched by (left to right) MRS. REYBOLD; MAJOR GEN. THOMAS M. ROBINS, deputy Chief of Engineers; Movie Star IDA LUPINO who recited dramatic sketch; and LIEUT. COL. WILLIAM H. PRESS, chief of Office Service Branch, Office of Chief of Engineers. At right is shown broadcast of Army Hour from Paris, France, which commemorated anniversary. Participants are (left to right): SGT. NORMAN WALLACE of Engineers; LIEUT GEN. JOHN C. H. LEE, commanding general, Communications Zone, European Theater of Operations; MAJ. GEN. CECIL R. MOORE, chief engineer in European Theater; and BRIG. GEN. JAMES B. NEWMAN, JR., commanding general, 9th Engineer Command.

CIVILIAN USERS get construction equipment. At left, first Caterpillar diesel tractor is sprayed with "highway yellow" instead of Army's "lustreless olive drab" paint used exclusively for several years. All machines allocated to civilians are now being painted the familiar shade of yellow. At right, first Insley excavator sold to civilian since 1942 is delivered to Jacob Day Excavating Co., of Indianapolis, Ind.



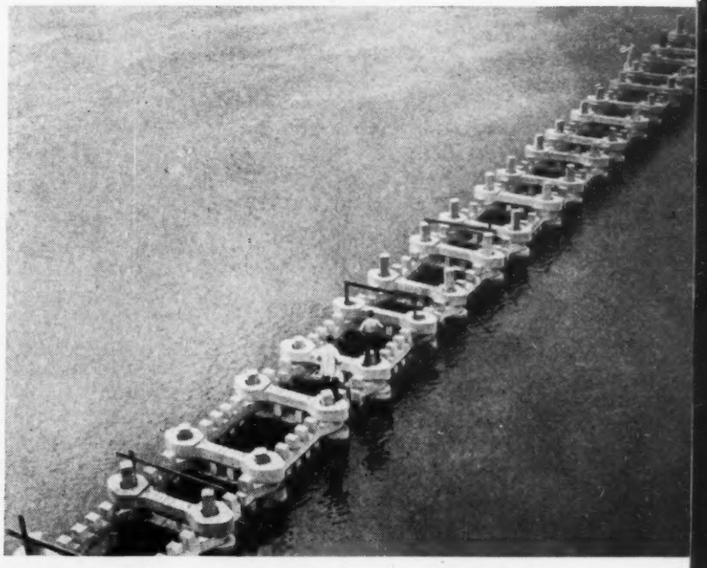
ALL CONSTRUCTION in American zone of occupation in Germany will be directed by CLIFFORD S. STRIKE (right), president of F. H. McGraw & Co., New York engineers and constructors. Before leaving to take charge as chief of Building Materials and Housing Branch of Economics Division of U. S. Group Control Council for Germany, he tells VINCENT B. SMITH (left), associate editor of "Construction Methods," that German materials, money and labor must provide homes for 11,000,000 before winter.



ROSS DAM is being raised 185 ft. above present height and widened 610 ft. across canyon of Skagit River, 150 mi. north of Seattle, Wash. In widening dam, which is variable radius arch structure, new abutment walls had to be drilled and blasted and concrete placing had to commence in outer wing sections to bring them up to present level. In right foreground are mixing plant and cement silo. Contractor is Morrison-Knudsen Co., of Boise, Idaho.

SEABEES DIG TUNNELS on Guam to develop additional source of water for fleet. Here they are using captured Japanese equipment to operate pump room at bottom of initial shaft. At right is small chain-bucket mucking machine used to load coral into narrow-gage cars.

Press Association Photo



PERMEABLE JETTY is first of five to be constructed at Cleveland, Ohio, to halt erosion of Lake Erie waterfront in Edgewater Park and build up sandy beach. New groins are of lightly reinforced concrete units, precast in steel forms, and are set in place by derrick mounted on scow. Placed 230 ft. apart, they will extend from 153 to 289 ft. into lake to reach water depths of about 8 ft.

A DOZEN CRANE BOOMS, with Bay City crawler unit in foreground, appear in this scene of mass unloading of supplies by U. S. Marines on Iwo Jima beachhead in South Pacific, indicating that types of heavy construction equipment other than versatile and well publicized bulldozer are playing important roles on our fighting fronts overseas.

U. S. Marine Corps Photo

WAR CONSTRUCTION IN Asia CONTRASTS ANCIENT AND MODERN TECHNIQUES

By Brigadier General **STUART C. GODFREY**

Air Engineer, Air Service Command,
India-Burma Theater

RECENTLY RETURNED to this country from the India-Burma Theater where he has been serving as air engineer, Air Service Command, Brig. Gen. Stuart C Godfrey is now commanding officer of the Aviation Engineer training center at Geiger Field, Wash. Prior to his leaving for overseas duty in the fall of 1943 Gen. Godfrey was air engineer of the Army Air Forces with headquarters in Washington, D. C.

IMPACT OF WAR on Asia is apparent in many ways, none more striking, perhaps, than in the construction field. Modern war always makes heavy demands on construction, and Asia is no exception. Best known single project in this theater is the Ledo Road, but noteworthy also are the numerous airfields to serve what has been in large degree an air war. Land routes of communication require many bridges, both fixed and floating. Needed too are many depots, housing projects, hospitals and the like. And always present is the urgency to provide all these facilities with the utmost speed.

Striking are the contrasts often presented between old and new methods of construction. Many primitive practices are still in use. Thus in India, where concrete structures have become fairly common, the concrete has been mixed and placed largely by hand methods. Mixers of small size have now been gradually introduced, but the concrete still makes its leisurely journey to the forms in driblets—being carried in trays on the heads of a procession of Indian laborers, men or women. Alongside some of these laborers, the big pavers and finishers that our Aviation Engineers used at the Superfortress air bases furnished a startling innovation. But the machine age will come, even to Asia, and the war has hastened its coming.

To illustrate old and new techniques, I have chosen two examples, both outstanding in their way, which could not present a greater contrast. First: A group of airfields in China constructed by dint of mass labor and hand tools. Second: Another group of fields in Burma built by Army Engineers with modern equipment flown to the site.

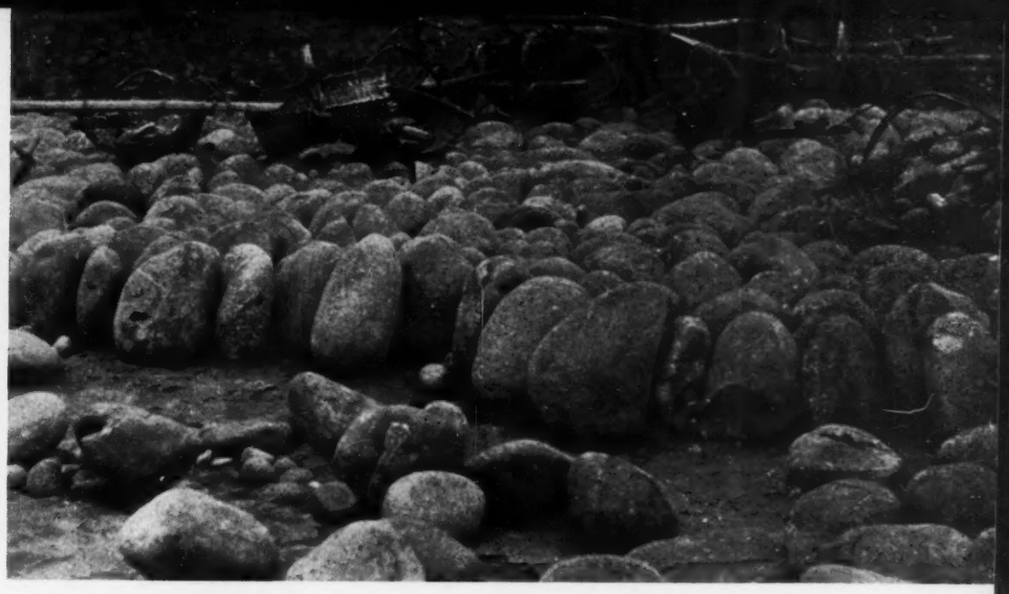
By the summer of 1944 the Army Air Forces were scheduled to have ready their new Superfortresses—mightiest of long-range bombers. But Japan's defense perimeter of outlying islands was at that time still unbroken, and only from China could the initial strikes be launched against Japan. Moreover, existing fields in eastern China were considered vulnerable, as events proved. Hence a project for new airfields in the Chengtu area was adopted late in 1943.

With a nod from the Generalissimo, his Minister Dr. Tseng Yang-Fu, greatest builder in China, went into action. Assisting him was a corps of Chinese engineers, many of them (like himself) graduates of American schools. Meanwhile we had set up under Gen. Chennault's command an organization of U. S. Aviation Engineers, headed by Col. Henry A. Byroade, with Col. Waldo Kenerson in local charge. Designs were prepared calling for the longest runways yet built in Asia, some 8,500 ft. Surveys were made jointly with the Chinese engineers and soil samples tested for the heavy wheel loads imposed by a plane weighing 130,000 lb. and more. Meanwhile the laborers had been gathered, 300,000 and more having been impressed by the provincial governor. In from their farms they came, traveling perhaps 100 mi. on foot, built their rough hovels to live in, and prepared to go to work.

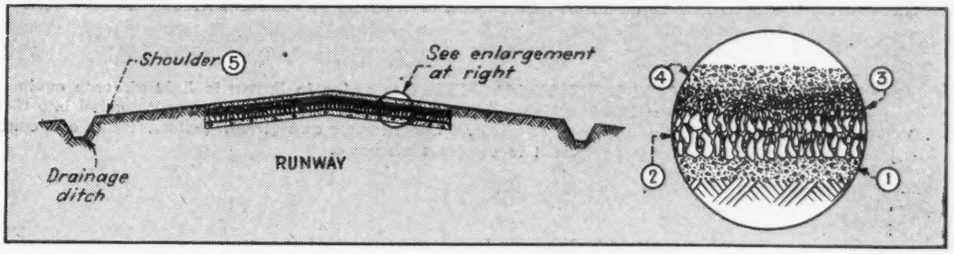
IMPROVED METHODS for transporting stone (below) include use of pneumatic-tired carts and wheelbarrows. Inadequate tools for building China's modern airfields contrast greatly with modern equipment used in other theaters.

CRUDE WOODEN CARTS and water buffaloes (below) are slow form of transportation when judged by western standards, but they represent an advance over hand-carried baskets.

METHODS OF CONSTRUCTION handed down through many generations of Chinese had to be supplanted by newer ideas. Here young Chinese have been taught to fill voids in crushed rock with coarse sand.



LARGE STONES placed on blanket of coarse sand or well-graded gravel form base course of pavement for super-bomber runway.



TYPICAL SECTION of 20-in. pavement designed to support heavy bombers on China's airfields. Native design, used for centuries in road construction, is improved by substituting coarse sand and gravel for mud slurry filler. Telford pavement with sand or gravel filler comprises: (1) 4-in. layer of coarse sand or well-graded gravel compacted by flooding and rolling; (2) layer of coarse rock of 8-in. maximum size (with voids completely filled with smaller stone, rock chips and dust, sand and gravel), compacted by flooding and rolling; (3) layer of coarse rock of 4-in. maximum size laid and compacted in same way as (2); (4) 4-in. surface course; (5) shoulders graded and compacted at optimum moisture.

I well recall a day in January 1944, when I flew over one of these airfield sites—a vast pattern of rice paddy fields. Some rock from the river had already been collected in stockpiles, but the leveling of bunds that separated the fields was just starting. Somehow the scores of thousands of coolies had been organized, with foremen and labor bosses to supervise, and cooks to prepare the big buckets of rice which they were fed. Industriously, even cheerfully, these laborers went to work. To supervise this enormous force, Lt. John Marshall, the resident Aviation Engineer at this field, had two other officers (one of whom spoke Chinese) and three enlisted men.

The Chinese, in general, build airfields much as they have built roads for centuries. The materials are rock and mud slurry. The rock is placed by hand in layers, Telford-like; the mud slurry is poured into the chinks. The result leaves much to be desired as to surfacing. These particular runways had to have a better engineering specification, including the use of sand, fine stone chips, and clay.

The various steps in construction can best be understood from the photographs herewith, with their descriptive titles. Particularly impressive in China is the operation of a 10-ton roller, drawn by a heaving team of 200 laborers. The photographs show details of building construction, including the techniques of woodboring and of cutting logs into planks. (The buildings required on these airfields were equivalent to a housing project of 1,600 family residences.)

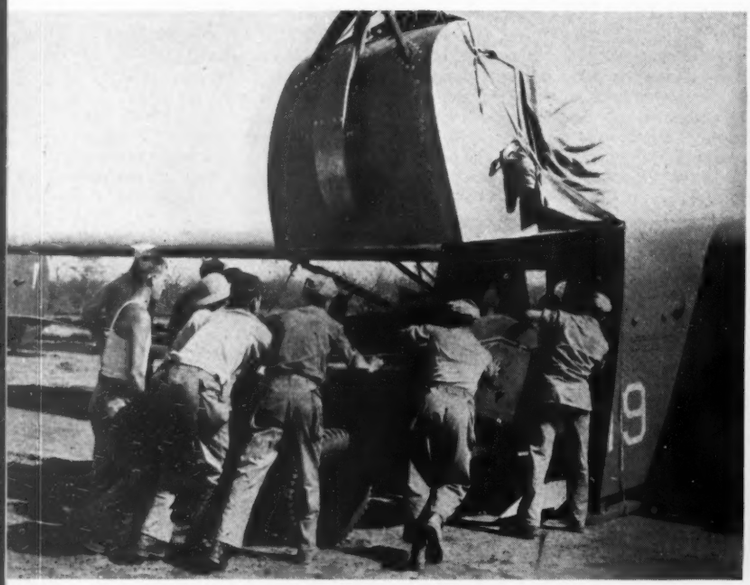
And so the work went ahead, under many difficulties: landlords had to be dispossessed, labor flare-ups straightened out, the handicap of language overcome, and the 90,000 laborers on this field taught that they must do the job according to our specifications. But all these difficulties were overcome, and there came a day in April, just 3 months

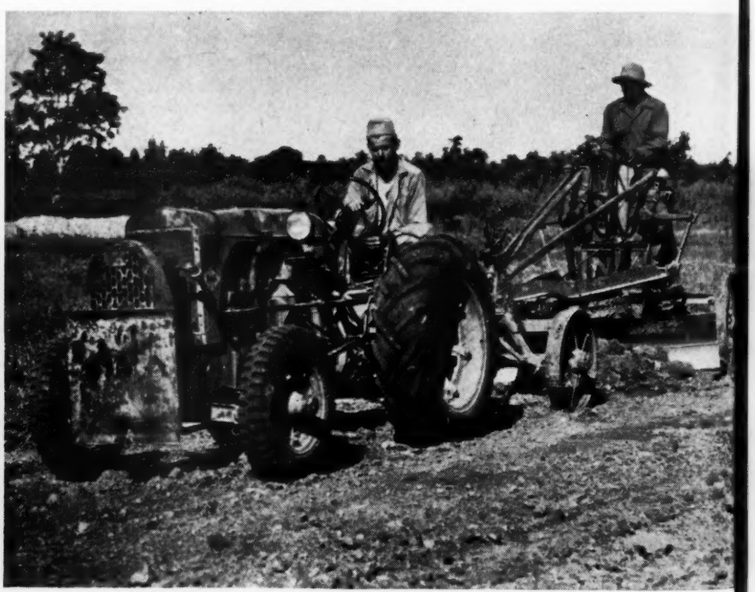
COMPARISON OF COOLIE POWER, which China expends generously on airbases, and modern mechanical power. Above, scores of coolies pull 10-ton smooth roller to compact surface of Superfort runway in China. In view below, sand-filled sheepsfoot roller, towed by light tractor, compacts sod-covered runway for use by cargo planes in early stages of advance operation.

after starting, when Lt. Marshall had some distinguished visitors. Great was the excitement when the first "big boy" landed, and rolled without making a mark on the newly completed runway. A few weeks later, this and three other new airfields served as the springboards for the first very heavy bomber strikes against Japan.

Much remained to be done. These gravel fields are not ideal, and require heavy maintenance. Recently, it has been possible to fly some asphalt into China. Even a thin asphalt surface treatment gives results superior to what can be done with tung oil, coal tar, or other local products available in small quantities. But these qualifications do not detract from the achievement of building these fields,and building them in so short a time. It is not surprising that the Chinese are proud of this triumph of their mass labor, plus the will to succeed, and that they compare it to the building of their Great Wall.

FIRST MODERN AIRFIELD CONSTRUCTION MACHINERY to arrive in Burma is light airborne equipment—specially designed to be flown to advance airfield sites in C-47 cargo planes or CG-4A gliders. Above, small pneumatic-tired tractor is loaded into C-47 under its own power, by means of ramp. Below, left, miniature scraper is loaded through nose of glider. Midget tractor and grader (below, right) are constructing runway at Myitkyina, Burma, preparatory to bringing in disassembled heavy equipment to complete airdrome.





ORGANIZED INTO LABOR GROUPS and supervised by native foremen under direction of handful of U. S. Engineers, 90,000 human ants (below, left) convert Chinese rice paddies into modern runway which will support bombers weighing 130,000 lb. and more. One of many thousands of laborers (below, right), laboriously breaks rock in same way his ancestors did centuries ago.

HOUSING FACILITIES at airdrome in China make use of native construction incorporating framed trusses and thatched roofs.

CRUDE SAWS with blades held taut by twisted strands of hemp rope are used by native workmen in preparing lumber for essential airfield structures.

In May 1944, the Japs held most of Burma. Some months earlier they had in fact invaded India; and Imphal and other Indian towns were not yet wholly freed from the threat of their infiltrating columns. In Northern Burma, Stilwell's task force, composed mostly of Chinese, had pushed down some 150 mi. from their starting point at Ledo in the Assam Valley of India. Behind them, as they advanced, had been carved out the Ledo Road.

Meanwhile an audacious thrust had been made by that eccentric genius, General Wingate, with the aid of Cochran's Air Commandos. On a grassy clearing far behind enemy lines, which had been reconnoitered only from the air, gliders landed by night bearing some combat troops and Aviation Engineers with light equipment. By the following evening, a lighted airfield was ready to receive scores of transport planes laden with Wingate's men. Thus "Broadway" and other similar fields had demonstrated the efficacy of our airborne Aviation Engineers to land in gliders and quickly provide fair-weather strips with their midget bulldozers and graders.

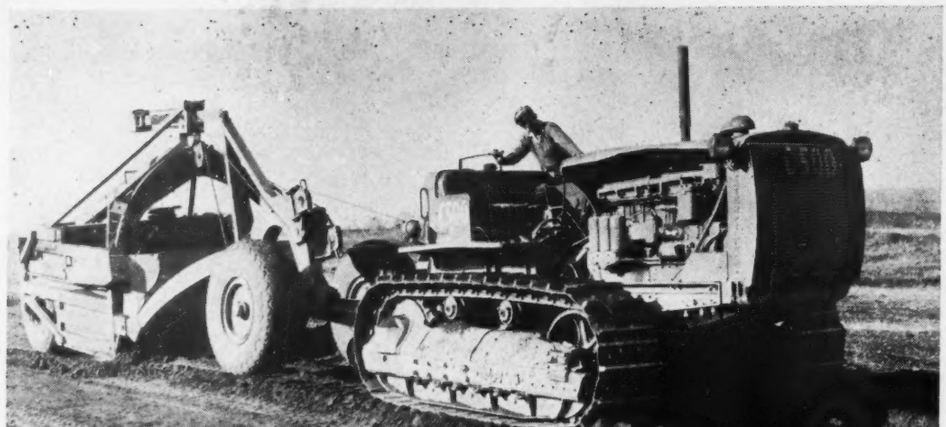
On May 17th, a detachment of Stil-

BOW DRILL is used by Chinese carpenters on native-type structures to house airfield facilities. Twisted rope unwinds from vertical shaft as cross piece in hands of workman is pushed down, thus actuating drill bit.

FILL FOR ACCESS ROAD on airfield in China (below) is placed by means of native-type hand-picks and baskets, over culvert in deep drainage ditch designed to carry heavy flow of surface run-off from taxiways, hardstands and runways.

U. S. Army Air Forces Photo

TREADMILL PUMP (below) is used by Chinese to supply water for construction of super-bomber bases.

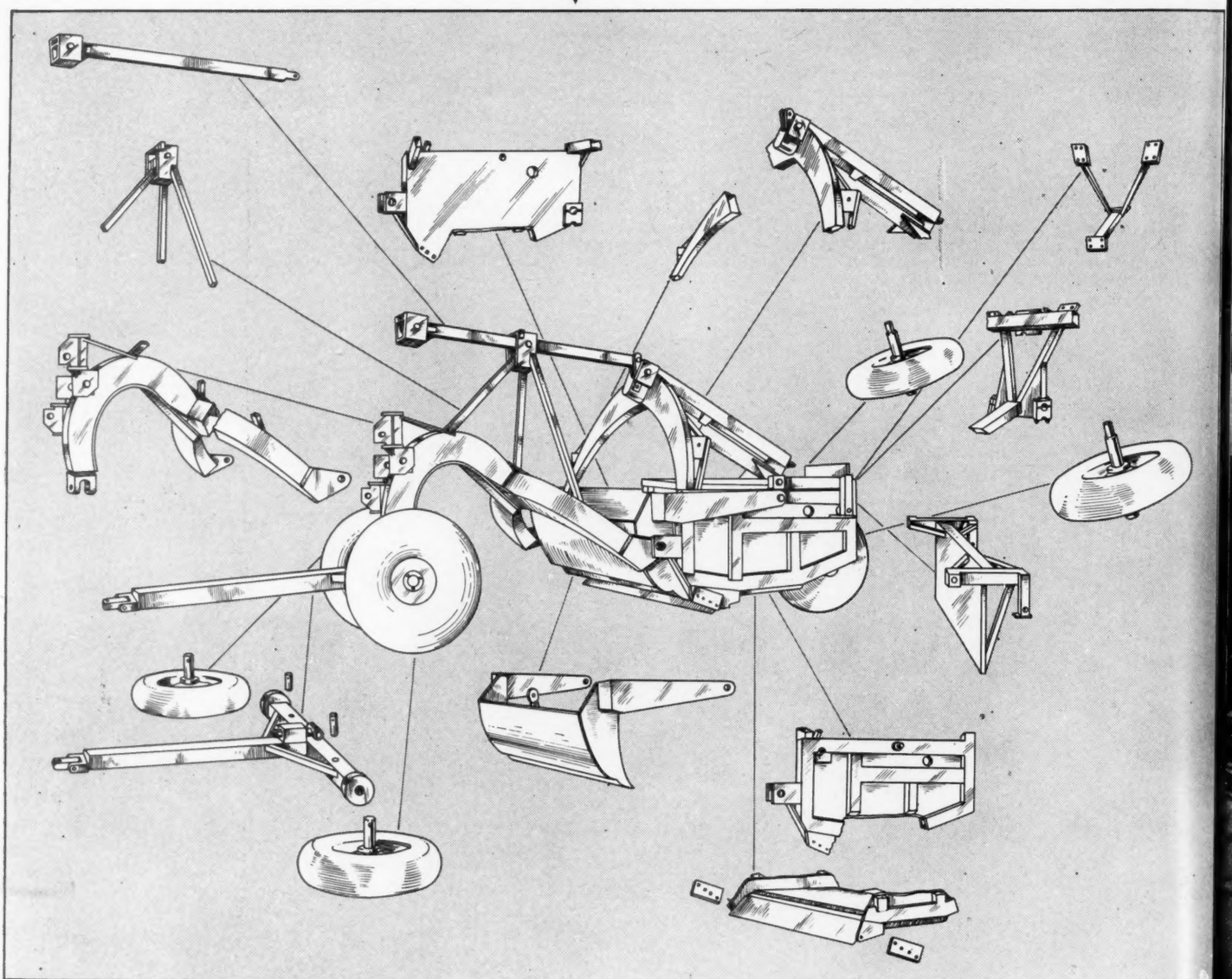


well's force under Merrill, after an arduous flank march, captured Myitkyina airfield. Their spent strength was insufficient to secure Myitkyina town close by, which was destined to remain in Jap hands for nearly 12 weeks. The airfield itself was a disappointment. Although rated as an all-weather airfield, its runway was only 75 ft. wide and 4,200 ft. long and was pockmarked with craters, the filling of which had been only partially and poorly accomplished. No hardstands, aprons, or taxiways existed. And the beginning of the monsoon rains had already softened the ground. Here was a more searching challenge to the Aviation Engineers, for unlike Broadway, this field must be made a permanent base, vitally important in view of the air support that had to be given to the isolated ground forces. Fortunately, an extensive deposit of gravel was available in one bank of the Irrawaddy River.

Aviation Engineers arrived at Myit-

(Continued on page 166)

TRACTOR AND SCRAPER flown in by cargo planes are reassembled and put to work at an advance base. Scraper of 8-cu. yd. size requires torch-cutting into 17 pieces, as shown by accompanying exploded drawing below, to be transported in four C-47's. D8 Caterpillar tractor, when equipped with angledozer and power control unit, requires 10 C-47's for air transport.



Floating Drydock for Seaplanes Uses

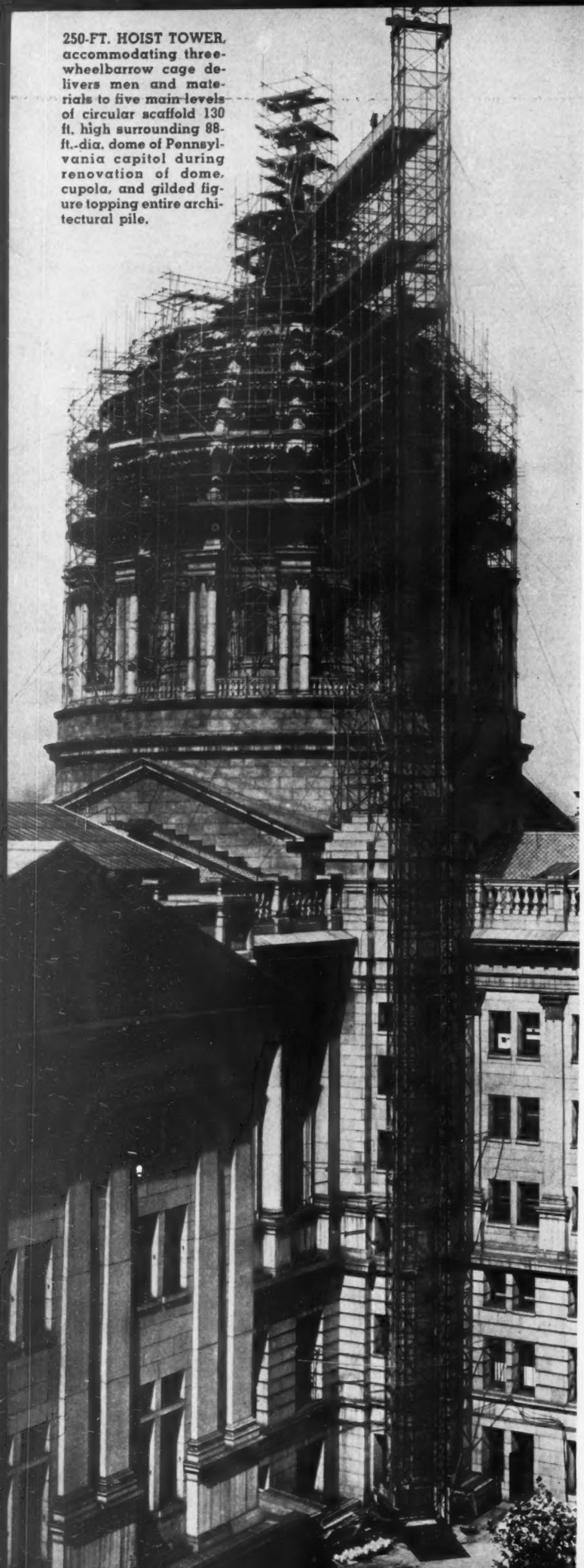
Sleeve Pontoon Towers

FLOATING STABILIZERS made with pontoon cells that slide on vertical guides are a distinctive feature of small floating drydocks designed by the Seabees for speed and convenience in making hulls of seaplanes accessible for repairs. General arrangement of the dock as a whole is much the same as in larger floating docks for which pontoon cells also are used. However, the type designed for lifting seaplane hulls, has a combination of three cells at each of the four corners arranged to give flexibility in operation and increased clearance under the wings by allowing the middle cell or sleeve pontoon to slide between the other two. Like the larger pontoon cell docks,

(Continued on page 154)

FLOATING DOCK here is in submerged position, with four sleeve pontoons projecting above adjacent pairs. Control valve manifold is in foreground.

IN RAISED POSITION of floating dock (below) cells of stabilizing towers return to their original position adjacent to floating sleeve pontoon.



250-FT. HOIST TOWER, accommodating three-wheelbarrow cage delivers men and materials to five main levels of circular scaffold 130 ft. high surrounding 88-ft.-dia. dome of Pennsylvania capitol during renovation of dome, cupola, and gilded figure topping entire architectural pile.

Free-Standing Scaffold

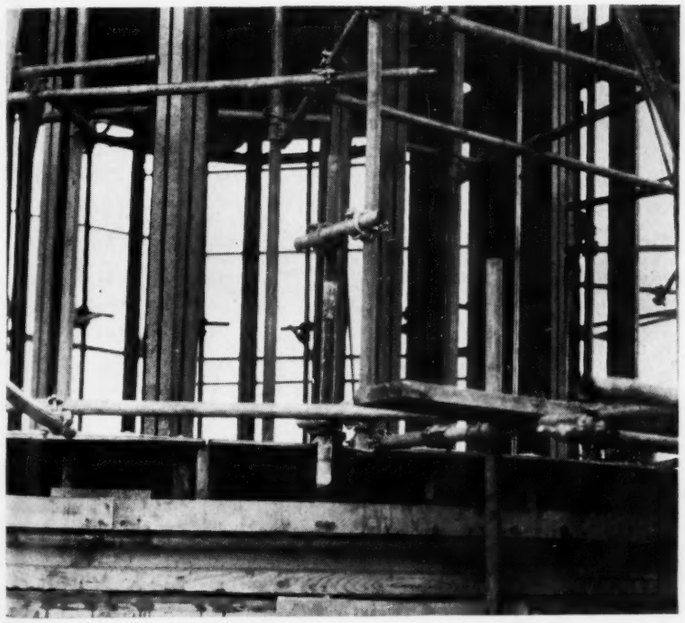
Covers State Capitol Dome

RENOVATION OF THE DOME, cupola and finial figure on the state capitol at Harrisburg, Pa., presented a problem to McCloskey & Co., contractor, Philadelphia, in providing a complete exterior scaffold which would put no weight on any part of the outside dome. To meet this requirement the Chesebro, Whitman Co., Inc., Long Island City, N. Y., erected for the contractor a free-standing scaffold 130 ft. high of tubular steel members supported from the floor of a colonnade 36 ft below the base of the dome; the height from this level to the top of the finial figure is 136 ft. Part of the scaffold load is transferred through two rows of dormer windows to the interior steel framing of the dome.

To deliver men and materials to this scaffold, the subcontractor installed a steel tower hoist 250 ft. high with runway connections from the tower to five main levels on the tubular framework surrounding the dome. Four intermediate platforms provide additional working levels on the dome scaffold. The tower elevator, an approved man hoist, accommodates a three-wheelbarrow cage which can be raised at a speed of about 225 ft. per min. by a Clyde single-drum hoist equipped

MOLDED WOOD RIBS (below) for roof of cupola on top of dome are made up into unit to facilitate raising and setting in place. Bottoms of these ribs will be cast as sleepers into new concrete roof of cupola.

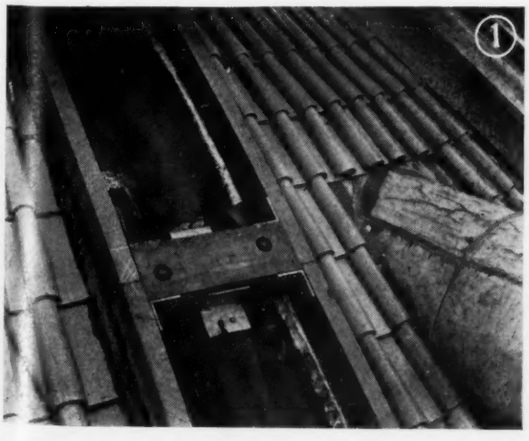
JOB OPERATIONS in renovating Pennsylvania capitol dome are carried out under supervision of these men: (Left to right) VINCENT P. CONNELLY, structural engineer for Bureau of Engineering and Construction, Department of Property & Supply; EDWARD EVANS, superintendent, McCloskey & Co., general contractor; FLOYD KROMER, resident inspector for state; and STANLEY RUTT, electrical inspector.

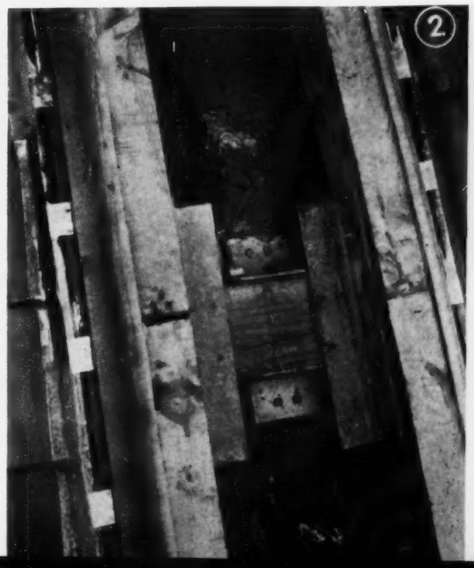


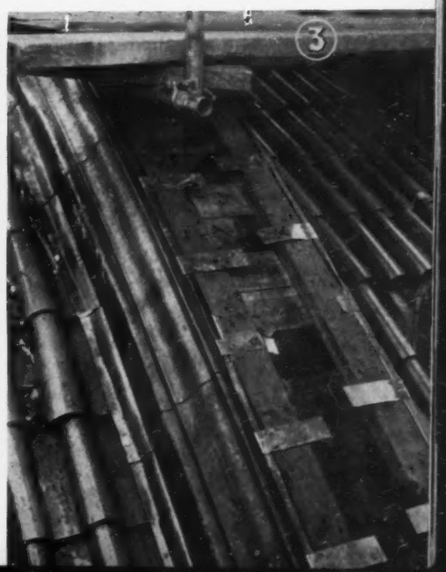
RECONSTRUCTED LANTERN, or cupola (above), is appropriately inclosed with limestone walls and columns. Lofty finial figure of Miss Penn receives new dress of gold leaf. During refurbishing, ball and figure stand on temporary falsework of angle irons above steel frame of lantern (left), which is cleaned and reinforced while exposed.

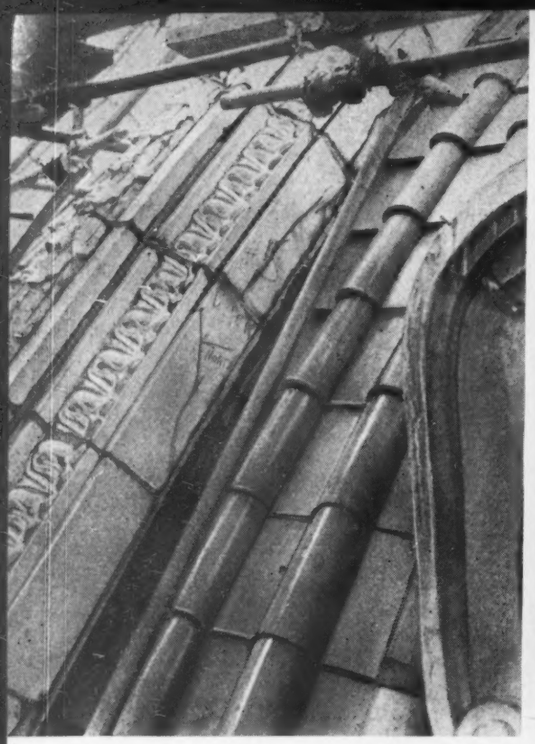
←

SATISFACTORY FACSIMILE of original terra cotta rib facing is built up by bolting wood blocking to steel frame (1), adding molded wood strips (2), and covering with sheet lead (3). Similar procedure is followed in building up and covering remainder of rib.









DAMAGED FACING on 16 steel truss ribs of capitol dome requires removal of terra cotta and replacement with more flexible covering.

SIMPLIFIED DOME RIBS have cover of sheet lead over wood molding. Scaffolding is braced by horizontal members through dormer windows to interior steel framing of dome.

with a G-E 80-hp. motor and controls.

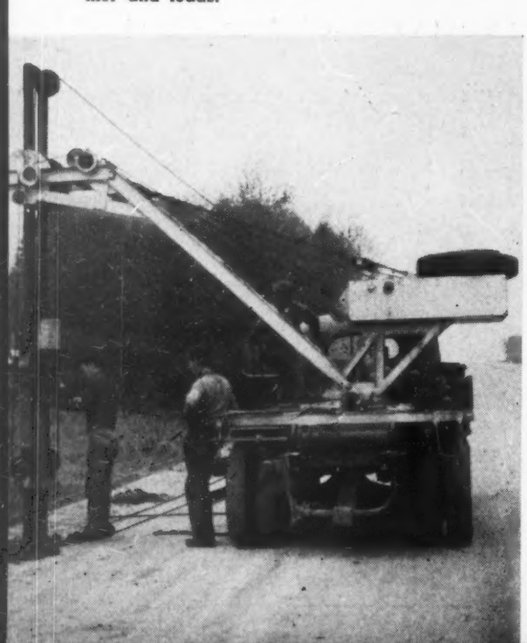
From the ground to the top of the finial figure on the capitol is 272 ft. The dome is a replica in smaller proportions of that on St. Peter's in Rome. Diameter of the dome is 88 ft., and its height is 48 ft. The cupola is 32 ft. high, and the finial figure of Miss Penn, including the ball on which it stands, measures 20 ft. in height.

Terra cotta exterior facing, damaged through the years since the dedication of the capitol by Theodore Roosevelt in 1906, is being removed from the 16 steel truss ribs of the dome. An accompanying photograph indicates damage suffered by the terra cotta. The original terra cotta facing is being replaced by a reasonable

(Continued on page 146)

Truck-Mounted Crane DRIVES GUARD RAIL POSTS

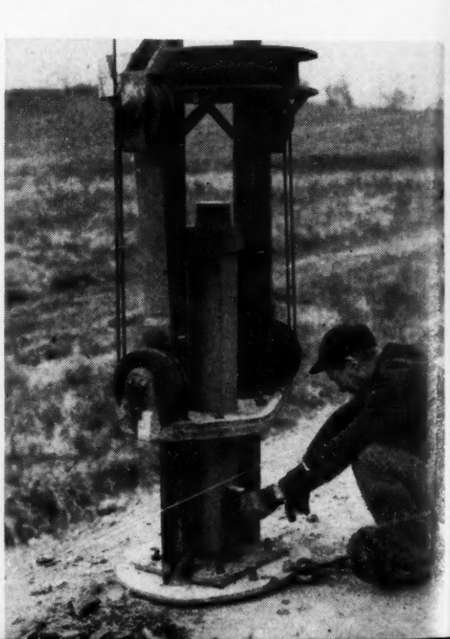
PORTABLE DRIVING OUTFIT (below) consisting of truck-mounted crane carrying special leads and 1,100-lb. drop hammer installs H-section posts for highway guard rail. Two winches driven from power takeoff of truck operate hoist lines of hammer and leads.



SPECIAL LEADS and an 1,100-lb. drop hammer operated by a truck-mounted crane drove 900 steel H-section guard rail posts at a rate of 100 per 8-hr. day for L. S. Lee & Son, Oaks Corners, N. Y., subcontractor, on three adjoining contract sections of U. S. 22 constructed east of Harrisburg, Pa., during 1944. Originally designed to operate an earth auger and ram, the Hughes-Keenan crane attachment has been equipped for post-driving purposes with tubular leads carrying a guide frame with removable slotted plates which fit over the posts. On larger jobs, the outfit has driven as many as 300 posts in a 10-hr. day with a three-man crew.

The posts are 4x6-in. wide-flange beams 5½ ft. long driven 3 ft. 4 in. into the ground on 16-ft. centers. Prior to driving, a small hole was excavated at each location to permit painting 6 in. below ground level. Accompanying pictures show the equipment and method of operation. T. H. Thomas, Harrisburg, is Pennsylvania manager for L. H. Lee & Son.

PLATE GUIDES (below) fitting over H-section post align steel member and leads in vertical position for driving. Attached to bottom plate is chain hoist to hold post in contact with taut string. Driving cap fits on top of steel H-beam. Foreman checks post for plumb with spirit level.



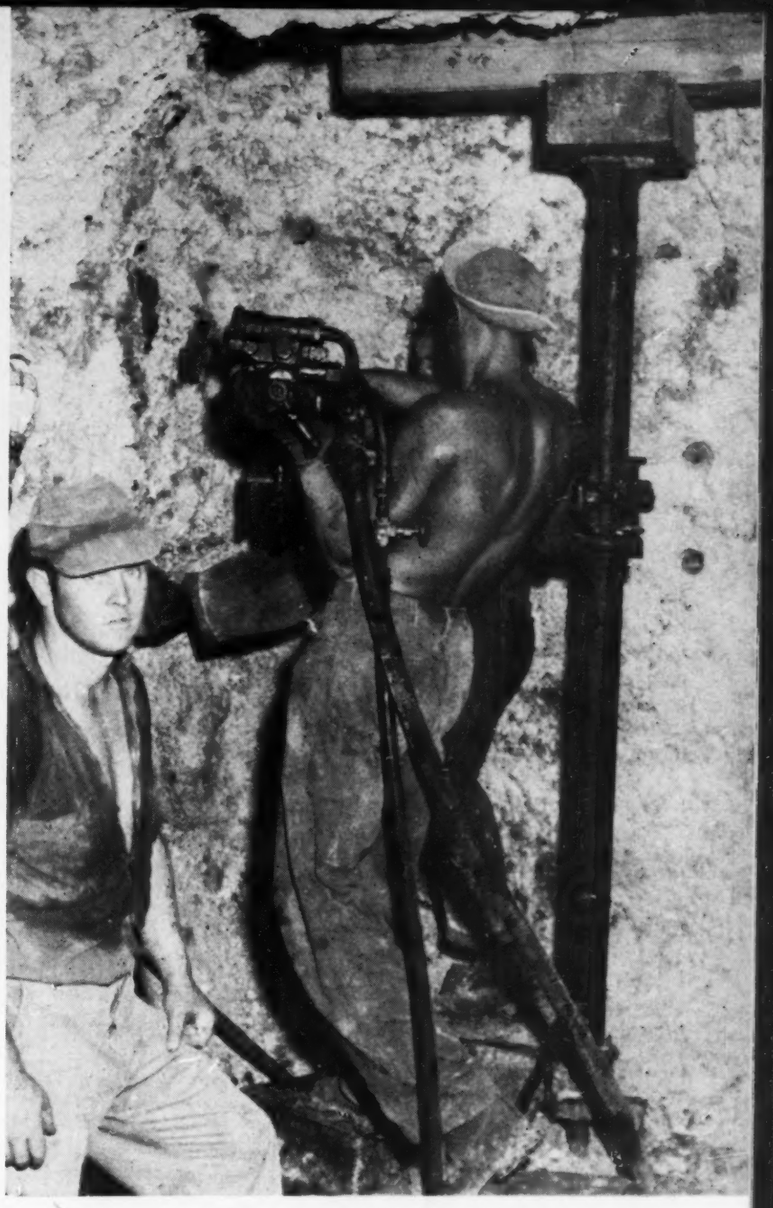
DIFFICULT 6x7-FT. DRIFT is driven 200 ft. through coral rock and mud seams by Seabees on island in Marianas Group. Geologists recommend project as source of water.

Seabees Drive Tunnel

Through Mud Seams and Coral

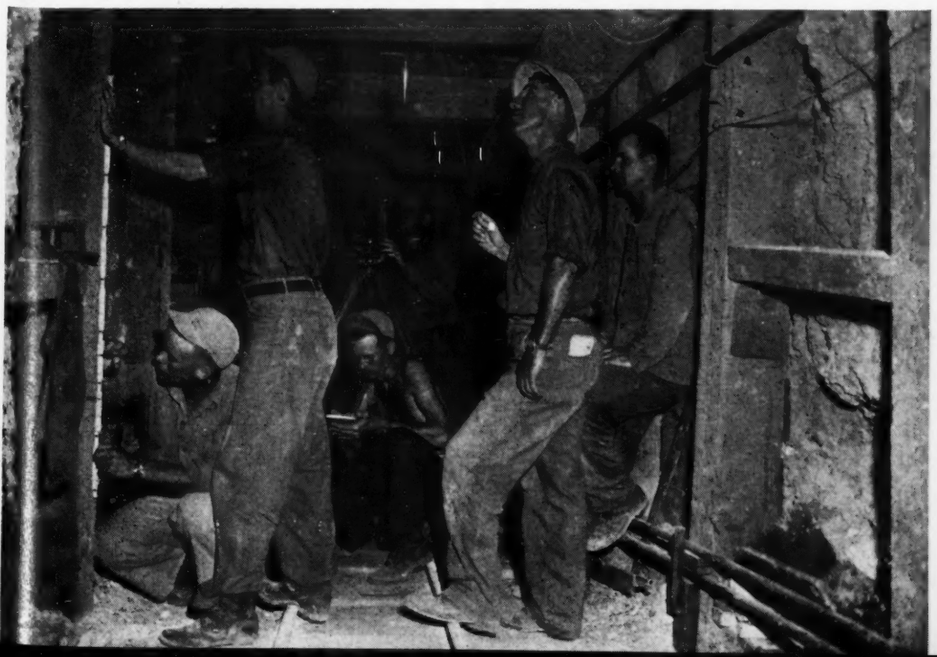
TUNNELING A 6X7-FT. DRIFT through 200 ft. of mud seams and coral rock on an island in the Marianas Group proved to be a more difficult operation than any the driving crew, experienced hard-rock miners serving with the Seabees, had encountered in civilian life. Probably the first such assignment for the Seabees, this tunneling project was undertaken as the result of studies by geologists to determine the best sources of water in large quantities.

A mucking machine and a Leyner drifter drill of American make were used by the Seabees on this job. The mucking machine operated on salvaged Jap rails in moving coral and mud to the mouth of the timbered tunnel. The rails were formerly part of an old narrow-gage track on which sugar cane had been hauled to a Jap mill before the mill was destroyed by war.



WET DRIFTER, mounted on column arm, drills blast holes in coral rock. Possibility of suddenly breaking into mud seams or caverns makes job one of the most dangerous undertaken by Seabees.

HEAVY TIMBERING (below) supports unstable material in tunnel walls and roof to prevent cave-ins. Surveying crew here checks tunnel alignment and grade. Tunnel men on this project include experienced hard-rock miners from Northwest and Tri-State districts.



MUCKING MACHINE (below) operates on rails salvaged from narrow-gage Japanese line serving destroyed sugar mill.

Use of Public Works to Sustain Construction Activity

By OSCAR B. COBLENTZ, President, McLean Contracting Co., Baltimore, Md.

The accompanying statement was filed with the Senate Special Small Business Committee by Mr. Coblentz on behalf of The Construction and Civic Development Department Committee, Chamber of Commerce of the United States, June 21, 1945. Mr. Coblentz is a past-president of the Associated General Contractors of America.

ANY WORK WHICH THE GOVERNMENT UNDERTAKES may conceivably be called public work. But that is not what we have in mind when we speak of public works in a competitive economy, whose active forces are private initiative and the risk-taking investment of private funds.

By "public works" we mean those needed structures, whether public buildings, dams, highways or other undertakings, which by common consent can best be financed and maintained by some governmental agency, either local, state, or federal, or some combination of these. We rule out made-work or pyramid building, and also undertakings which the taxpayers cannot afford, or which would compete with private business activities.

Construction's Part in Economy

In an active post-war economy, we may, according to Department of Commerce figures, reasonably count upon new construction work to be somewhere in the neighborhood of 10 percent of the national output or 12 percent of the national income. Public works on the basis of past experience will constitute about 33 percent of this new construction work, or about 3 percent of the national output or 4 percent of the national income.

These percentages, while approximate only, are significant. In the first place, if public works are only 3 or 4 percent of the national economy, depending on how we measure it, then it is evident that such a very small tail can not wag the whole economy. Next, even if we take all new construction work, including public and private work, which is around 10 or 12 percent of the national economy, depending on our measuring stick, and add another 2 to 4 percent for repair, maintenance and remodeling, we still have too small a segment to be used to offset the ups and downs of the whole economy.

Because of its extreme fluctuations, however, and their widespread good and bad effects, this construction segment is highly important to the economy. These percentages do not tell the whole story. There should also be added a qualification to the use which has been made of them. They indicate approximately what we may expect will be the relative position of construction to the whole economy in the post-war period of anticipated active business. They do not answer the more difficult question as to what percentage of the economy construction is likely to be, or should be, over a long period which includes depressions as well as booms.

We are forced to this conclusion: The construction segment of the economy, consisting of public works and of other new construction which is privately financed, and of repairs, maintenance and improvement of existing structures of all kinds, can make its most effective contribution to the whole economy through measures designed to sustain its own volume so far as that is practicable.

Measures which are designed to use construction to offset unemployment in other segments of the economy, as well as in its own, miss the mark. These over-ambitious measures not only fail to accomplish the goal but tend to destroy the opportunities for practical measures to minimize the ups and downs in construction itself. One harmful influence, as we learned from our experience in the thirties, was the distorting and unbalancing of construction employment by injecting inept and inexperienced workers temporarily into this field. Such measures also tend to discourage risk-taking investments through threats of government competition with business.

Public works, while only a small percentage of the national output, are approximately one-third of new construction activity. They are therefore an important factor to be reckoned with in devising measures to sustain activity in the construction field. Obviously even in the construction segment of the economy, public works cannot solve the whole problem.

Private construction work, which is two-thirds of the total, must also play its part. This means there must be acceptance of measures which will encourage a more steady flow of private investment funds into new structures of all kinds and into improvements of existing structures. We must always remember in that connection that the primary purpose of construction is to provide structures essential for serving specific needs.

Improve Market Information

One way to bring about acceptance of measures which will minimize the ups and downs of private work is through provision of current information about the construction market. To be helpful such information must be in a form which can be used by those responsible for initiating and financing private construction work, as well as by those who design, construct, and supply the material and equipment for structures.

Trade associations, private and government agencies can make a substantial contribution to this needed information by instituting improved reporting practices. In a widespread, highly diverse, localized industry, however, such as construction, there is no one private industry organization equipped to assemble all the needed current data.

Such assembling of construction market information in one place is the proper responsibility of an impartial government agency, such as the Bureau of Foreign and Domestic Commerce. The government itself, and also private concerns, need a central place for authoritative and unbiased information on construction activity, both private and public. There is a distinct public interest in an activity which must be the foundation of measures designed to encourage a better sustained volume in the future.

of construction work than we have experienced in the past.

The Bureau of Foreign and Domestic Commerce should be provided with the necessary staff, organized in a construction division, to assemble current data on construction activities. This should include work which is going forward and which can reasonably be anticipated, and the amounts of employment and of construction materials and equipment involved. The proposed construction division can do this without duplicating the fact-finding activities of other branches of the government and of trade associations and private agencies.

Secretary of Commerce Wallace has already called attention to the interest of the Construction and Civic Development Department Committee of the Chamber of Commerce of the United States in this important matter. He has outlined the broad objectives of such a construction division, including the important item of working with the construction industry to make the information which is assembled and such studies as are undertaken most useful to it.

Public Works Control

Since decision to go ahead or not with respect to public works rests with government it is frequently assumed, without much analysis, that public works can be scheduled in advance, plans and specifications prepared, and then held back at times when private construction work is going full swing, or promptly let to contract when private construction work shows signs of falling off.

Analysis will quickly reveal that this desirable goal has some very definite limitations, and, in addition, that to reach it, even within these limitations, will require intelligent study and observation of current and continuing trends and much hard and patient work.

Let us look first at the limitations, and then at the difficulties to be overcome.

Relation to Private Works

Many public works are complementary to private construction work and to other activities in the economy. When private residential building, for example, is active there is need for street and highway improvements, for public schools and playgrounds, for extensions to water and sewage disposal systems. These and other public works could not arbitrarily be held back without interfering with private construction work in this important field. The close relations which exist between highway improvements and activities in the automobile, rubber, petroleum, trucking, bus and other industries, and between airports and the aeronautical and related industries are other examples of the limitations which the complementary nature of public works necessarily places on their use as a work reserve.

There is need for a careful study to determine just what public works can be held back and for how long without causing more harm than good. This might well be undertaken by the Federal Works Agency in cooperation with the states and communities. There is need to get away from generalities and down to concrete facts.

There is also need for a companion study which will show the number and skills required of construction workers on different kinds of public works and the amounts of construction materials and equipment required for their construction.

With such basic data in hand the probable effects of holding back or advancing different classes of public works will be known. Without them the proposal to use public work to sustain construction activity remains in the realm of generality and guesswork, where one opinion is as good as another.

OSCAR B. COBLENTZ, president, McLean Contracting Co., Baltimore, Md.

Let us look now at the difficulties to be overcome.

They are largely of an administrative and legal nature, although there are also involved the usual difficulties in bringing about some rather drastic changes in long standing customary procedures. The government agencies which are responsible for public works activities are numerous, and they are spread throughout the country. There are several important major, and a number of minor, federal agencies which are responsible for such activities. There are thousands of state and local agencies which have important responsibilities in this field. Some of these are legislative bodies which decide what public works will be financed, including Congress, state legislatures and city councils, and also the voters of a state or community when acting in their quasi-legislative capacity of approving or disapproving proposed bond issues. Others are administrative agencies which frequently initiate public works programs and in practically all cases responsible for seeing to it that the financing, designing, and construction of authorized public works are carried through in accordance with the legal requirements and that afterwards these public works are maintained.

There is at present no effective coordination of the policies of these various legislative and administrative agencies, with a view to advancing or retarding public works in the interest of sustaining activity in the construction segment of the economy. Public works are undertaken much as private construction work is, namely, on the basis of apparent need, the ability to finance, and the willingness to undertake the work at any given time. Our experience to date has been that when times are good both private and public works go forward in increasing volume, and when times are dull both fall off. The same factors apparently have about the same influence on both kinds of work. It will take a deliberate, well organized, and continuous effort on the part of the federal and state and local governments to bring about a more desirable flow of public works.

Reserve of Post-War Public Works

Let us turn now to the preparations on the part of the states and on the part of the federal government for getting needed public works started promptly after the war. These activities have resulted in setting up machinery to facilitate the preparation now of plans and specifications for postponed and needed public works. This can have an important bearing on the long-term problems of using public work to sustain construction activity.

Funds have been made available for making surveys and preparing plans for federal-aid highways, including those which can now be constructed in urban communities. This important federal-state program is going forward.

In the field of federal public works the President has taken an important step which Congress should follow up. He has requested the federal agencies to submit their proposals for public works to the Bureau of Budget for scrutiny before their submission to Congress. The Budget Bureau, according to the director's statement to the Colmer Committee of the House in May, 1944, has not at present the staff, funds, and machinery to examine critically the proposals submitted to it in accordance with this Presidential order. This should be corrected.

It is important that there should be a central place in the executive branch of government for consideration of the overall relationships of proposed federal expenditures for public works before their submission to Congress. If this were matched by similar overall consideration by Congress, with the help of a joint staff

(Continued on page 161)

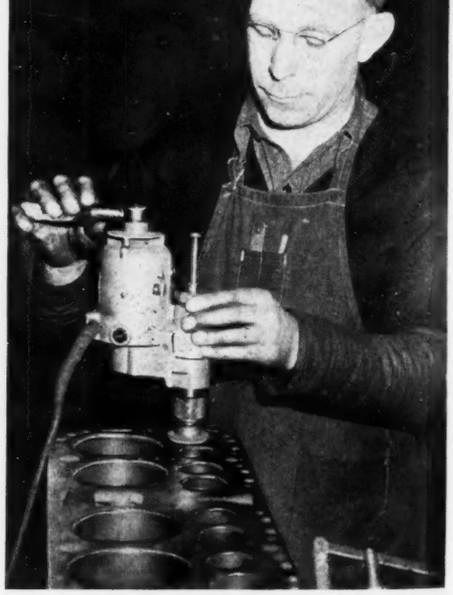
Portable Shop Tools

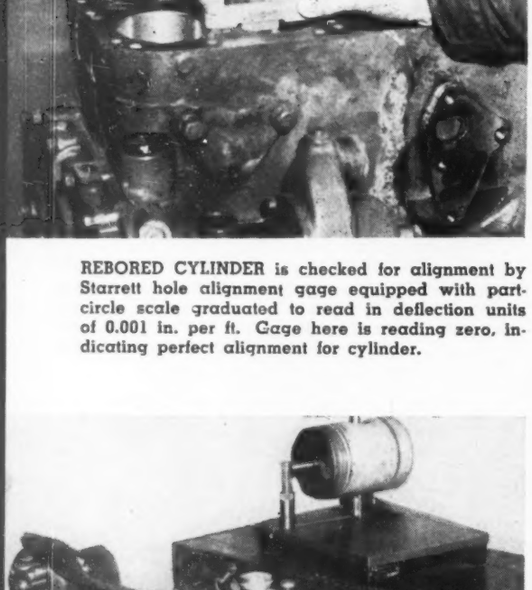
Facilitate Engine Maintenance Jobs

PORTABLE TOOLS to simplify and speed cylinder reconditioning work on internal combustion engines have proved to be great savers of time and labor in the equipment maintenance shop for District 1, New York State Department of Public Works, Waterford, N. Y. In connection with major maintenance of some 350 power-driven equipment units oper-

BORING BAR capable of reboring cylinders from 2.625- to 5.3-in. diameter is set up on block of Hercules JXB engine to recondition worn 3⅝-in. cylinders by cutting them to slightly larger diameter. Special micrometer, supplied as standard equipment with Van Norman boring bar, is used to set tool holder for reboring to exact cylinder size desired. Four non-revolving expansible and contractible catspaws, not visible, center boring bar in cylinder. Shop has second similar boring bar of larger size for cutting cylinders of 3.4375- to 7.5-in. diameter.

TO REMOVE SHOULDER, or ridge, at top of worn cylinder in which new piston rings are being installed (when cylinders are not being reconditioned) workman sets up Lisle cylinder ridge reamer on block of Buda KTU engine and turns bar of reaming tool with Walden-Worcester ratchet wrench. After tool has been set up, about 5 min. work is sufficient to ream one cylinder, removing ridge which could damage upper piston ring of new set.



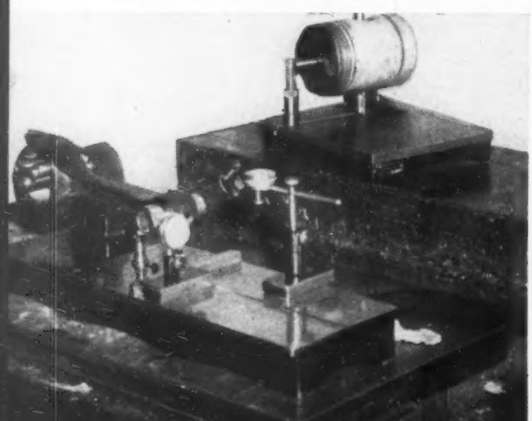


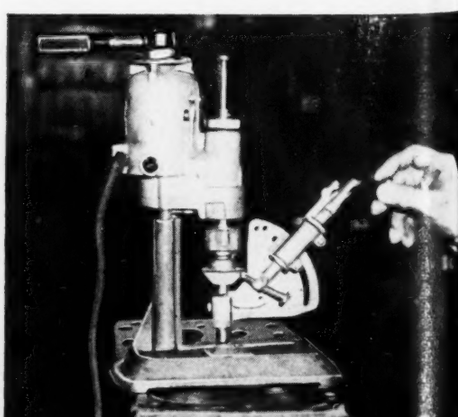
REBORED CYLINDER is checked for alignment by Starrett hole alignment gage equipped with part-circle scale graduated to read in deflection units of 0.001 in. per ft. Gage here is reading zero, indicating perfect alignment for cylinder.

WHEN NEW SEATS are required for exhaust valves, this Hall valve seat inserter, equipped with pair of boring tools, cuts recess for new valve seat. After new seat has been tapped into place with drive-fit equipment, valve seat inserter is used again with spinning tool to crimp engine-block metal into chamber around insert, thus locking new seat in place.

VALVE is ground with Hall electric-motor-driven grinder operated by **ED HARTNETT**, veteran machinist in equipment maintenance shop.

DIAMOND-POINT DRESSING TOOL (below), moved up and down by hand lever, dresses rotating grinding wheel on Hall valve seat grinder.





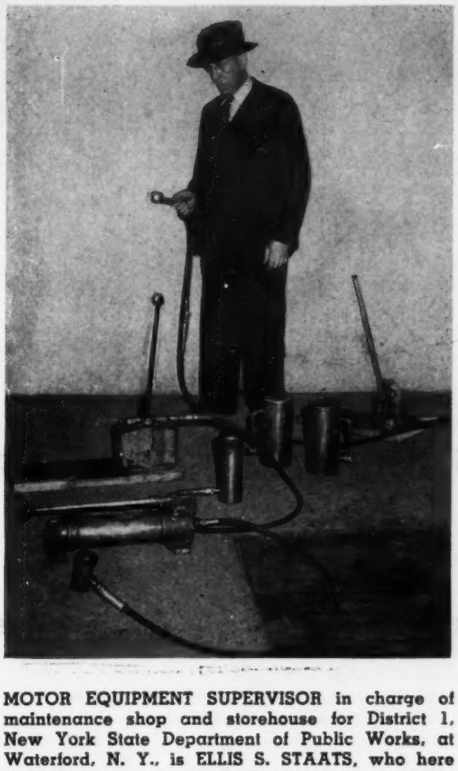
PAIR OF ALIGNMENT JIGS provide quick means of checking connecting rods and piston pin holes. In foreground is connecting rod alignment jig which detects both twists and bends in rods. Connecting rod is placed on jig supports, and adjustable dial indicators graduated to 0.001 in. are brought into contact with wrist pin, first on one side and then on other, to check connecting rod for both bend and twist. On tool box in background is pin hole alignment jig which determines whether pin holes are square with piston and in line through center. Alignment jigs are products of Wadell Engineering Co., Newark, N. J.

ated by the district, the shop takes care of reconditioning and rebuilding gasoline engines varying in size from single-cylinder 2- and 3-hp. units up to large multi-cylinder power plants of rollers, motor graders, excavators and heavy trucks. The equipment used by maintenance forces in District 1 includes 98 trucks, 25 automobiles, 2 power shovels, 1 crawler crane, 3 truck cranes, 8 10-ton rollers and 1 7-ton roller. Other items range all the way from small mixers, paint sprayers, pumps and conveyors to large power graders and bituminous paving spreaders.

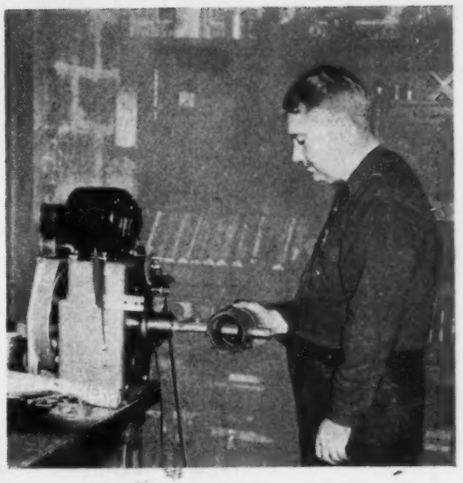
Only two district shops in New York state have cylinder reconditioning tools equal to those illustrated by accompanying photographs. It is expected that the remaining eight shops will be similarly equipped after the war. Expansion and improvement of district shops and of supplemental maintenance shops in 57 counties outside the limits of New York City take high priority in the Public Works Department's program for postwar development.

About half the counties now are provided with shops, but a number of these shops are unsatisfactory. The same condition applies to some of the district shops, such as that at Waterford, the first in the state, which has long since outgrown its antiquated plant. District 1 comprises eight counties but is divided into nine maintenance areas, only two of which are at present equipped with

(Continued on page 186)



MOTOR EQUIPMENT SUPERVISOR in charge of maintenance shop and storehouse for District 1, New York State Department of Public Works, at Waterford, N. Y., is ELLIS S. STAATS, who here displays some portable hydraulic jacks available for district maintenance jobs. In his hand is 4-ton-capacity capsule-size ram hooked up to Blackhawk Porto-Power unit. Other Blackhawk equipment on floor includes 7-ton Porto-Power outfit in foreground and 20-ton unit behind it. To right of these units are two 50-ton hydraulic jacks used with snow plows.



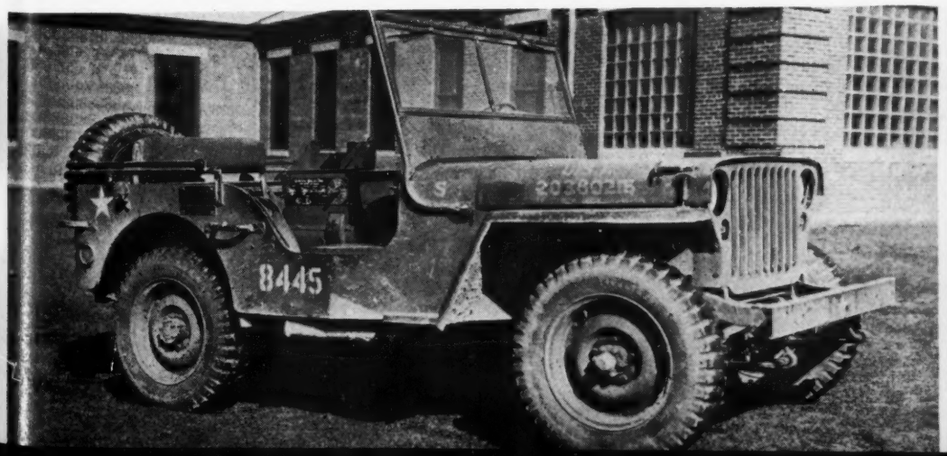
COMPACT BENCH MACHINE (above), designed and used primarily for grinding wrist pin holes and bushings, serves as well for number of other jobs, such as grinding connecting-rod pin holes, grinding steering spindle pins, line reaming bushings for pump shafts and grinding hydraulic brake cylinders. Sunnen machine here is being utilized to grind wrist pin holes in piston. Shop carries stock of grinding tools for holes ranging from 2.300 to 0.480 in. Tool of approximate size is inserted in chuck, and final adjustment is obtained by turning dial which gives control of movable grinding stone to 0.0001 in. Operator keeps foot on pedal while machine is operating. For quick stop, he merely removes foot from pedal, thus releasing idler pulley which holds belt tight during operation. Machine eliminates all wrist pin troubles in District 1. Because of smooth and accurate grinding, it is necessary to allow wrist pin clearance in order to avoid seizing. FRANCIS X. MOHAN, present welder and former machinist, is operating machine.

Compact Arc-Welding Unit MOUNTED ON ARMY JEEP

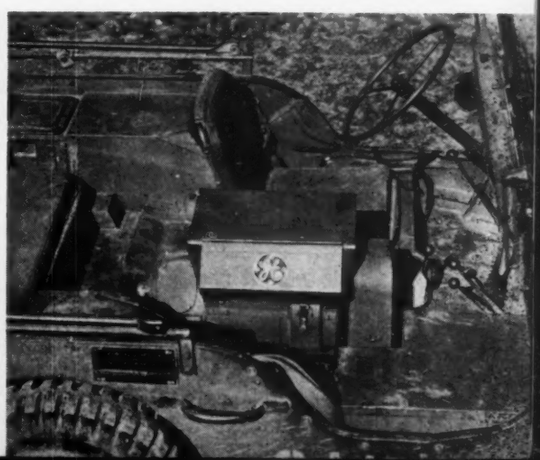
MODIFIED ARC WELDERS mounted on standard ¼-ton Army jeeps are being used extensively by maintenance organizations in the combat areas. Because of their compactness and light weight, as well as their maneuverability over difficult terrain, these mobile General Electric units have also been adopted for jungle operations and are expected to be used for airborne and amphibious operations.

Driven by a V-belt on a power take-off from the jeep's engine, the welders are bolted to the floor of the jeep in place of the right-hand front seat. They provide 40 to 250 amp. of current, and are capable of handling electrodes of various sizes up to and including those of ¼-in. dia. The welders are ready for use as soon as the jeep is stopped. A governor, which is disengaged by a hand-operated clutch for normal operation of the vehicle, maintains a uniform engine speed during the welding operation, while belt guards and heavy protective covers safeguard personnel. When not in operation the welders do not interfere with the customary use of the jeep, since the closed cover serves as a seat. A feature of these welders is that they are not dependent upon resupply of oxygen and acetylene cylinders as would be the case with oxyacetylene units.

WELDING GENERATOR (below), mounted on Army jeep for use by maintenance crews in combat zones, receives power from jeep engine.



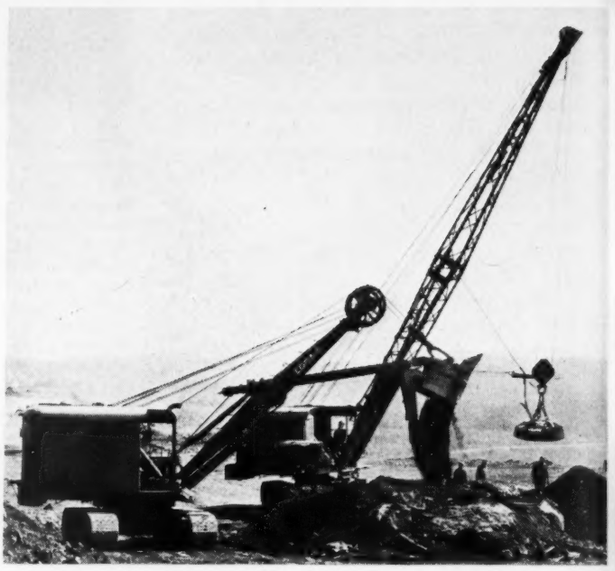
CUSTOMARY USE OF JEEP is not impaired by arc-welding unit, as closed cover can be used as seat.



HOW They Did It

CONSTRUCTION DETAILS For Superintendents and Foremen

LONG-TIME LOAD TEST is made of full-scale wood truss just outside new Lumber Industry Laboratory operated by Timber Engineering Co., Washington, D. C. Viewing test are (left to right): FRANK HANRAHAN, National Lumber Manufacturers Assn.; F. G. SCHWORM, engineer, Third Service Command, Baltimore, Md.; O. L. FOOTE (in background) Arlington County, Va., engineer's office; A. W. BURKHOLDER, engineer, Office of the Chief of Engineers; and ANDREW JENSEN, Arlington County building inspector. On moderate fee basis for interested applicants, laboratory conducts experiments and tests leading to commercial utilization of fundamental timber research done elsewhere.

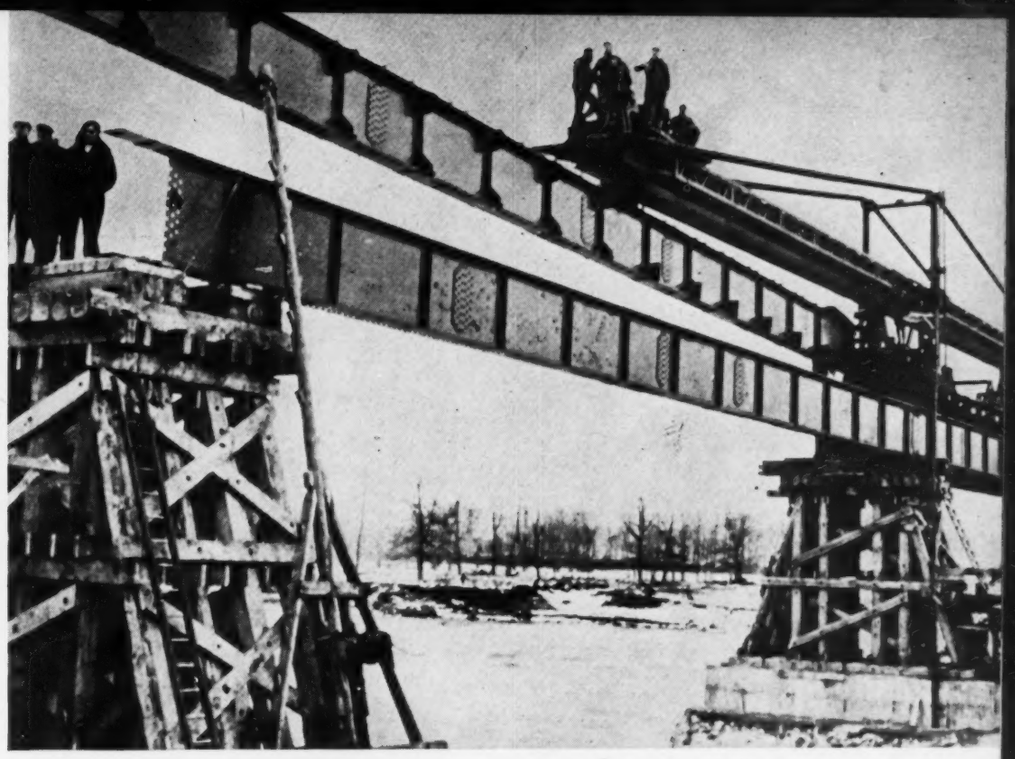


← TRENCH 7 FT. DEEP (left) for telephone cable between Los Angeles and San Diego is excavated by 15-ton plow 10 ft. high, 12 ft. wide and 35 ft. long, pulled by tandem Caterpillar D8 diesel tractors. Cable-laying trailer pushed by another tractor, traveling in reverse and dragging bulldozer blade to cover trench and level ground surface, follows close behind plow.

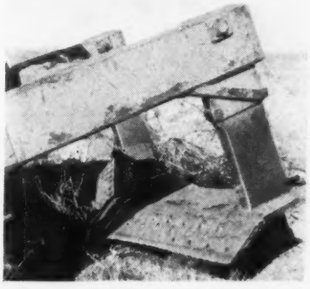
↑ METAL REFUSE is salvaged from dump near steel mill by Lorain crane equipped with magnet operated by small International power unit. Shovel is dumped with swinging motion to spread material, and then magnet is swung over it to pick up scrap metal and deposit salvage in special pile on job being performed by Robert M. Chambers, Turtle Creek, Pa., salvage contractor.

RIVETED RACK added to lower edge of bulldozer blade on Bucyrus-Erie tractor shovel attachment enables Marines to use this equipment, with cable sling, as substitute for fork lift in handling pallet loads of supplies on Pacific beachhead.

COLD RIVETING at Cannonsburg, Pa. plant of Fort Pitt Bridge Works utilizes heavy pressure to form heads on unheated rivets. This process, it is claimed, enlarges shank of rivet sufficiently to fill hole completely, resulting in greater stress-carrying value and improved workmanship. Pressures are controlled in accordance with rivet size and material. Machine here is fabricating plate girder for large mill building.

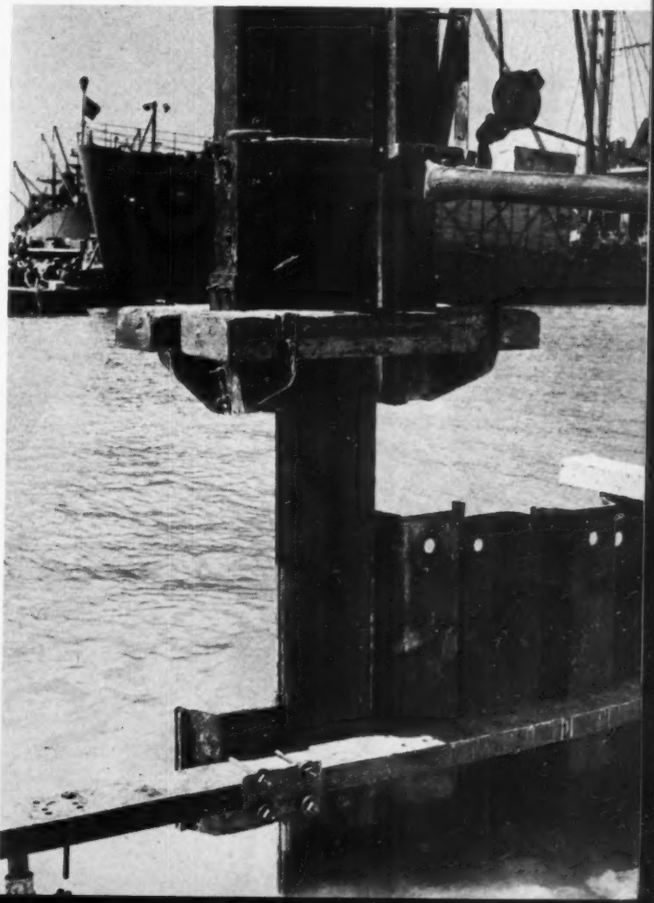


GIRDER ERECTOR taken over by French from Germans to rebuild destroyed railroad bridges consists of parallel latticed members supported from trussed bent on railroad flat car which transports girders to bridge site. Traveling carriage running on two latticed girders of erector boom carries mobile hoist car which picks up bridge girder at its mid-point. Girder is rolled forward by traveling carriage to extremity of boom (which is tied down at rear end to counterbalance load) and is moved transversely by secondary, mobile hoist car into position for lowering on bridge seats. Photo from European

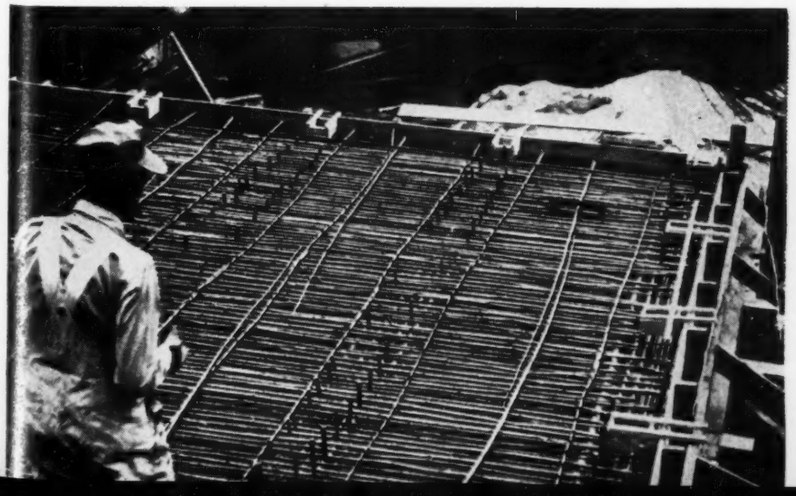


LAND-CLEARING BLADE (above) attached to rear of powerful crawler tractor cuts mesquite and other roots 14 in. underground on Tucumcari, N. M., irrigation project of U. S. Bureau of Reclamation. In photo (left), blade has been raised to shake out heavy roots. Originally patented by Holt Equipment Company, Weslaco, Tex., blade is now manufactured by LaPlant-Choate Manufacturing Co.

SPECIAL JIG is used by Navy's Seabees to position and hold in place steel sheetpiling being driven in construction of pier at small craft dock.

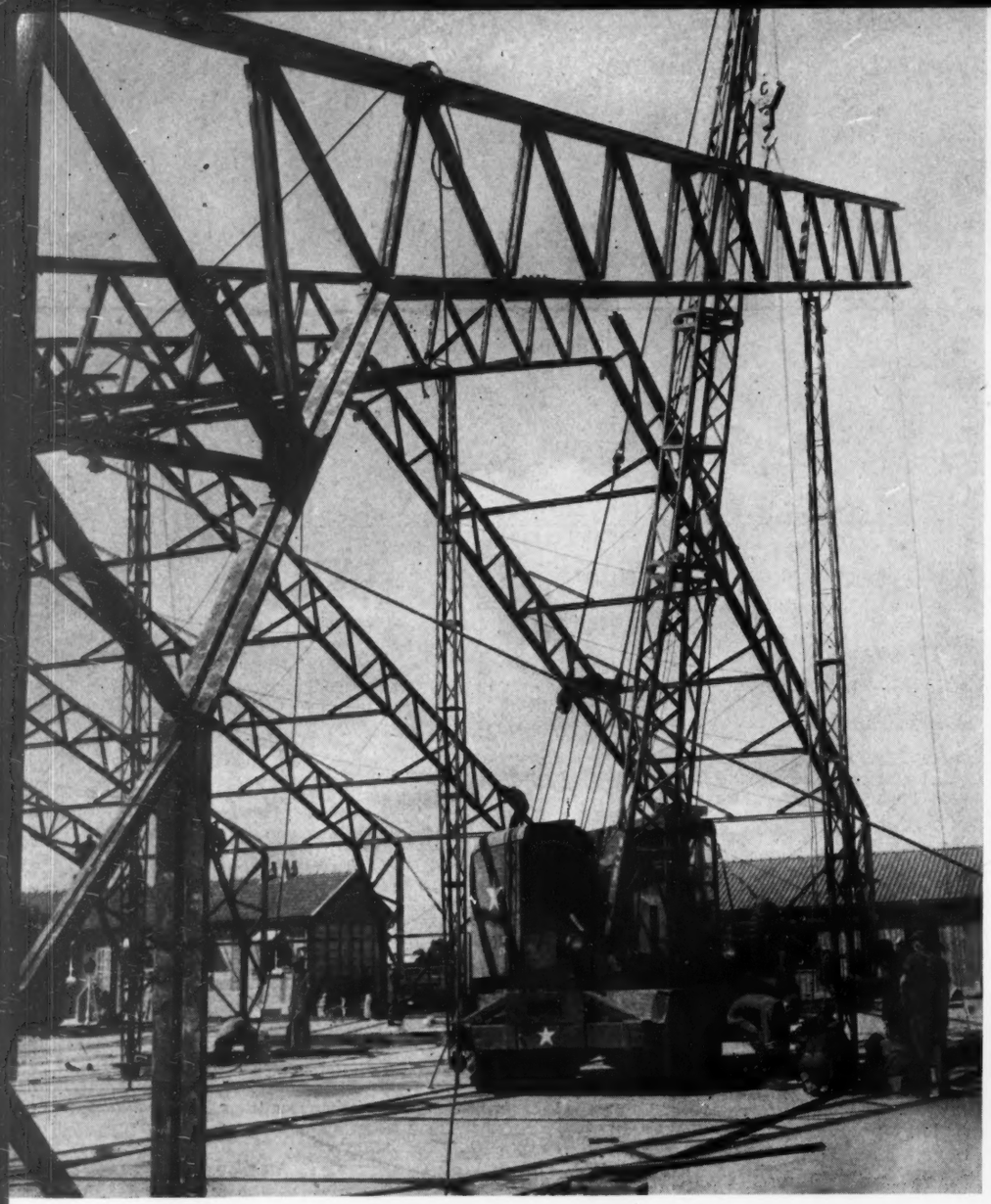


BAMBOO REINFORCEMENT is tested in construction of concrete stadium at Clemson College, Clemson, S. C., where H. E. Glenn, professor of civil engineering, attempts to determine whether native trees might be used successfully in concrete construction at South Pacific bases. Stadium is built with Incor high-early-strength cement in effort to have concrete harden as quickly as possible, before bamboo can swell.

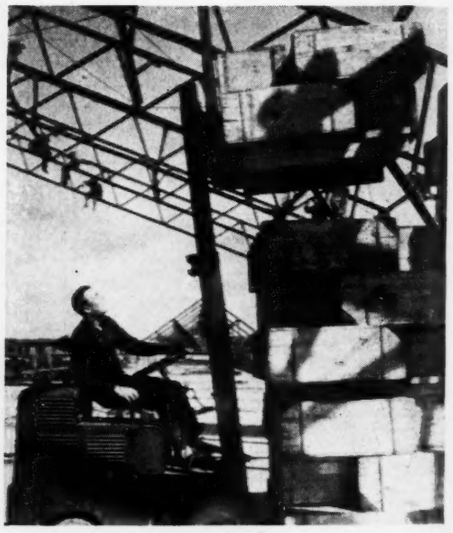


Hangar-Type Warehouse

STORES ARMY SUPPLIES IN FRANCE

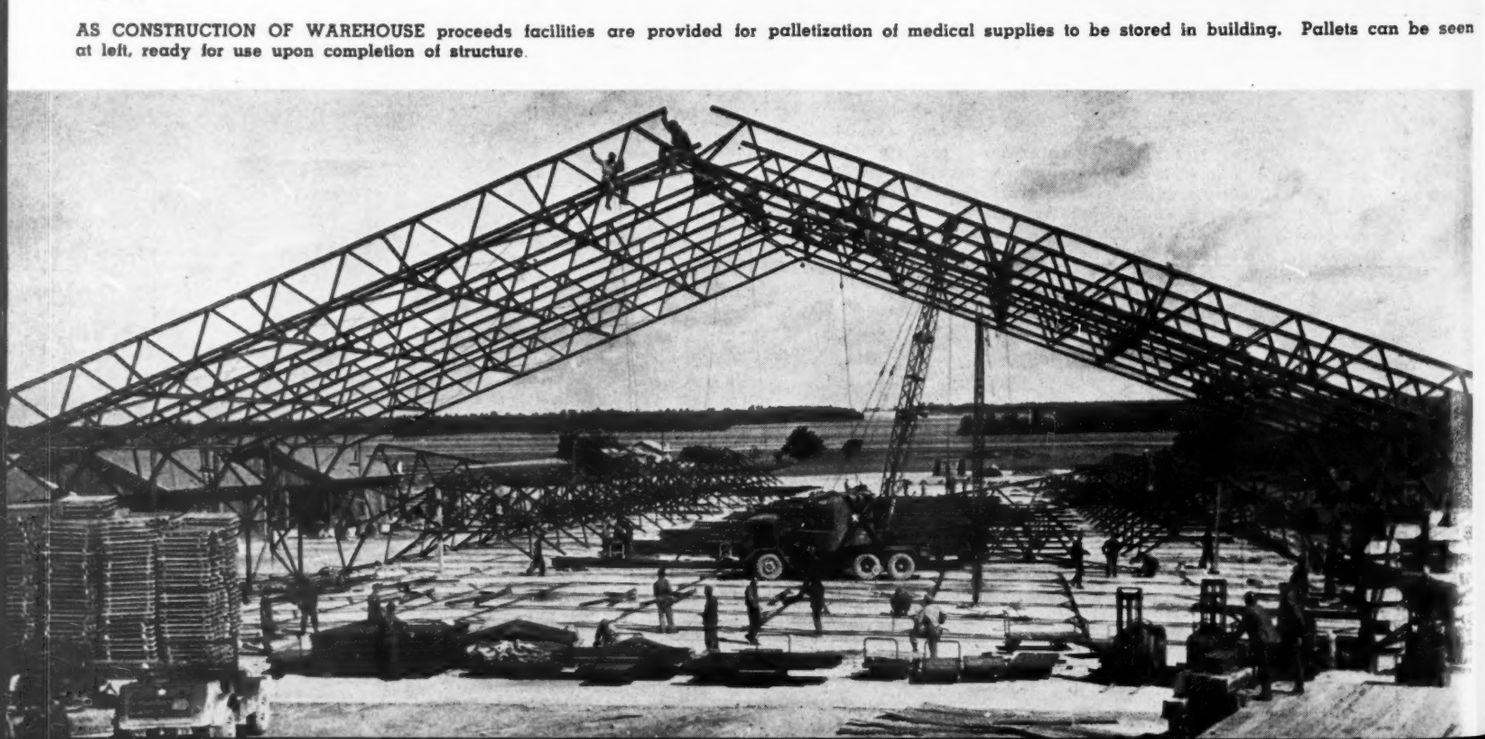


CRANE SUPPORTS TRUSS of Butler hangar-type warehouse while temporary latticed jackpost is placed. Warehouse, built by German prisoner-of-war labor under Army Engineer supervision, will serve as medical depot at Assembly Area Command, Mourmelon, France.



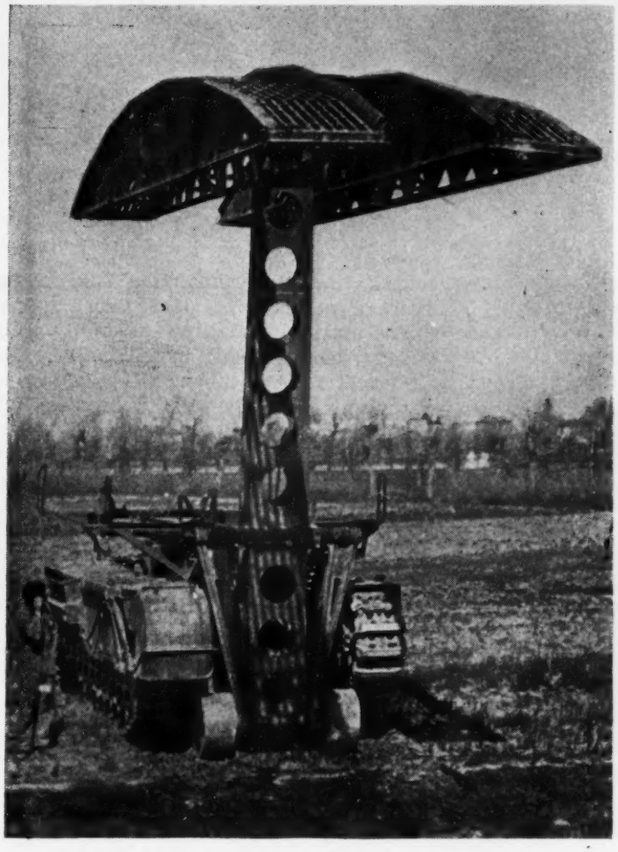
FORK LIFT TRUCK at medical depot in European Theater of Operations expedites handling of medical supplies on pallets. Here, Maj. O. A. PARSSINEN demonstrates use of equipment.

AS CONSTRUCTION OF WAREHOUSE proceeds facilities are provided for palletization of medical supplies to be stored in building. Pallets can be seen at left, ready for use upon completion of structure.



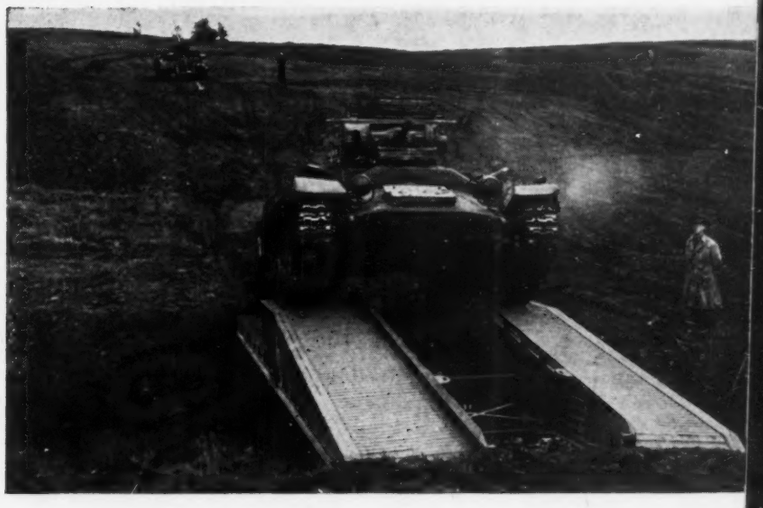
JOB oddities

ELEPHANT SHUNTS BOXCAR of Bengal & Assam Railway in India on siding at Bogapani near Ledo. This section of railway is operated by U. S. Army Military Railway Service. This 80-year-old elephant can push several loaded cars, eliminating need for shunting engine. Signal Corps Photo

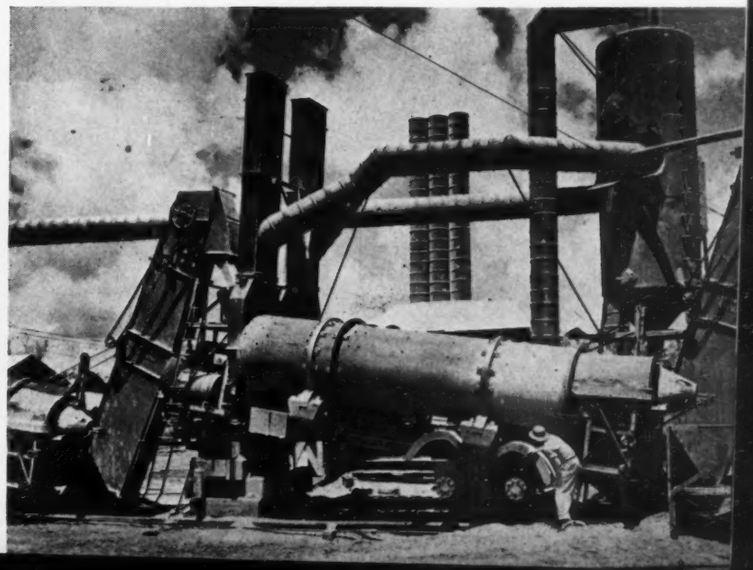


BIG BEN, London's famous clock (below), gets face lifting. It is again illuminated and panes of glass broken by bomb blasts have been replaced. Here two steeplejacks hang hundreds of feet above street to wash 365 panes in each face. Wide World Photo

BRITISH TANKS (below) carry and lay their own bridges. Operated by crews in tanks, they can be used under fire for crossing small rivers and canals, surmounting anti-tank ditches and concrete emplacements, and scaling cliffs and other obstacles. Hydraulic pivot arm (left) raises 30-ft. span steel trackway mounted on Churchill tank hull preparatory to placing it in position. Below, tank crosses bridge placed by machine in background. British Combine Photos



OIL DRUMS form breechings, ducts and smoke stacks of Seabee asphalt plant which is used with Barber-Greene mixer to furnish asphaltic concrete for paving roads on Guam. Wide World Photo



PRODUCTION LINE SYSTEM is used in cutting and trimming lumber for rafters of 1,329-unit housing project at San Lorenzo, Calif.

Production Line Methods

SPEED HOUSING PROJECT

IN THE FACE OF A HEAVY DEMAND for moderate-priced homes, a demand rendered difficult to meet because of an acute shortage of skilled mechanics, a West Coast contracting firm, Bohannon & Chamberlain of San Mateo, Calif., developed streamlined building methods which resemble those of a factory production line.

The mass production methods were used in constructing an entire village at San Lorenzo, Calif., consisting of 1,329 separate three-bedroom houses, complete with shopping center, theater, playground, public utilities and other improvements, including 30- and 36-ft. paved streets. San Lorenzo Village, considered one of the largest private housing projects in the world, accommodates a population of 6,000. It was completed in 8 months at a cost of $7,000,000.

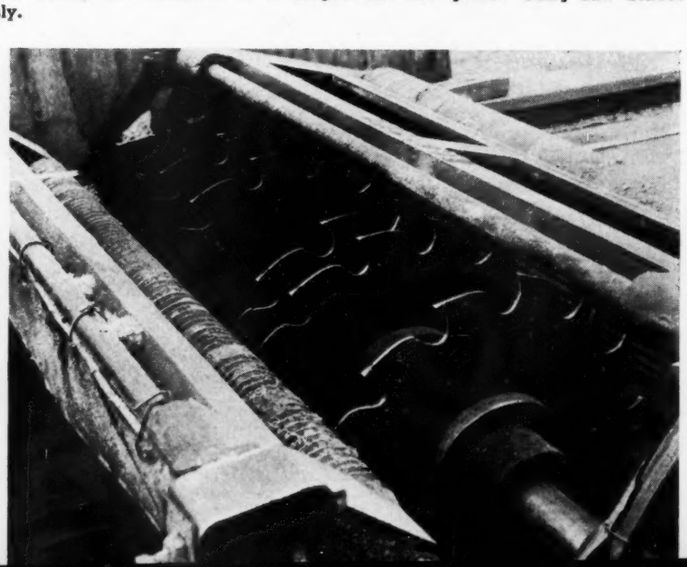
Dwellings are five-room frame and stucco structures of varied design, with a minimum of 1,000 sq. ft. of floor space per house. Lots average about 5,000 sq. ft. Under the terms of an agreement with the FHA, two thirds of the houses were rented and the remainder sold at an average price of about $6,000.

Pre-cutting and line assembly conveyor systems were introduced by the contractors as a means of stepping up operations. The general procedure followed in using the conveyors is illustrated by the successive steps taken in preparing parts for rafter assemblies: (1) Initial power saw made eave end and rafter seat plumb cut, (2) second power saw made jack for hip, (3) final cut in seat of rafter was made by an electric hand saw, and (4) rafters were segregated and stacked according to size.

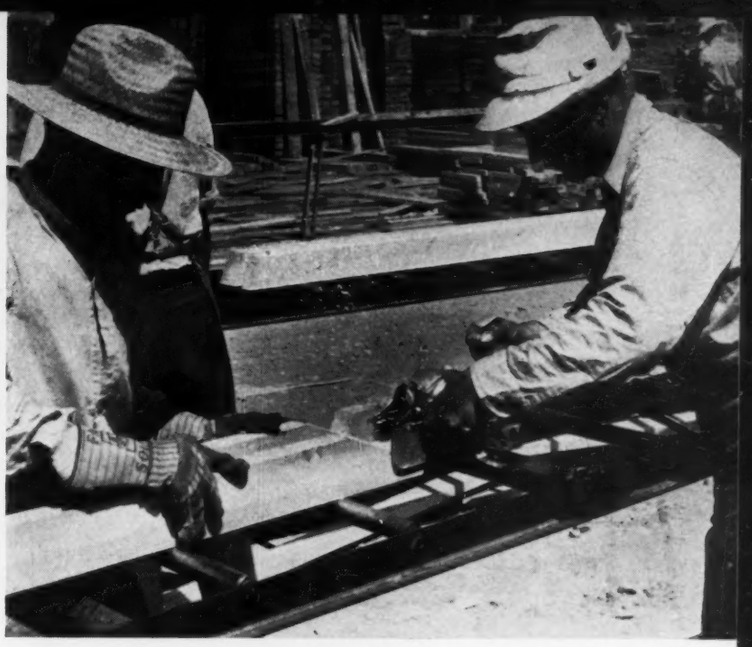
Rafter cutting was speeded by setting the saws to cut one length of rafter for a group of houses before changing to a similar operation for another group. Studs were cut in a like manner except that only one power saw was used in making the length and trim cuts.

Shortage of materials frequently necessitated the use of odd-size lumber. When smaller sizes were not available, an Economy saw (American Sawmill Ma-

SMALL SIZE LUMBER, not available in quantity, is ripped from larger sizes (left, below) and classified as to length, size and grade. Gang saw blades (right) are set for cutting four 1x12's into four 1x6's and six 1x4's, simultaneously.



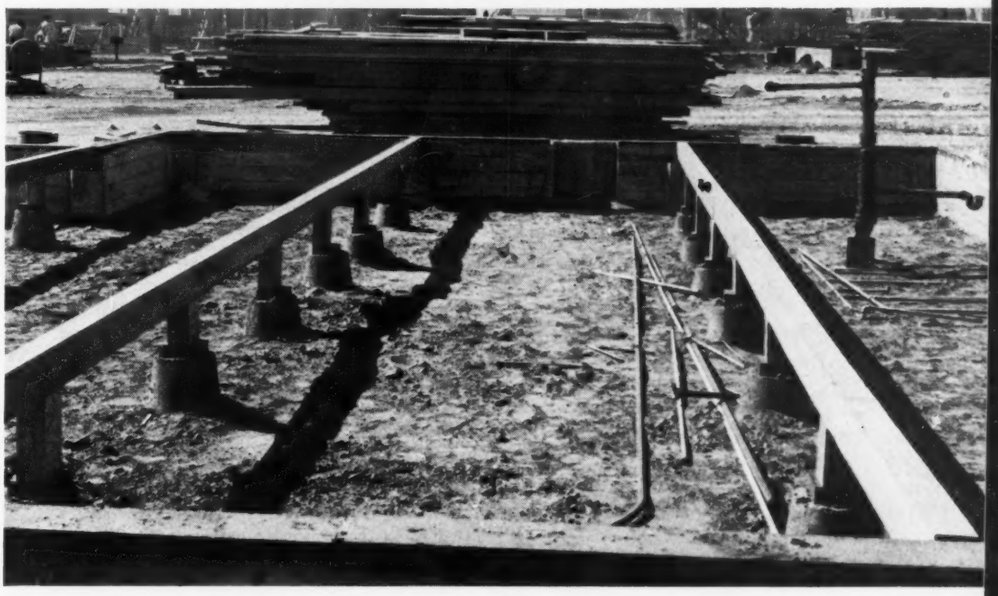
ANGLE CUT on rafter overhang is made with variable-angle head on DeWalt saw. Work is speeded by using one setting of saw for group of houses before changing to similar operation for another group.



ELECTRIC PLANER is used on rafter overhang. Ability of individual trained workmen to perform single operations efficiently obviates need for journeyman carpenters skilled in all operations.

chinery Co.) with five adjustable blades, was used to cut 1x12's into needed widths. One setting of the blades permitted simultaneous cutting of four 1x6's and six 1x4's.

Factory assembly-line methods were also introduced in actual building operations. Because of the shortage of journeyman carpenters, the contractors found it necessary to employ whatever labor they were able to recruit. As a result, each crew of men was assigned to a specific task: for example, one crew was given the job of erecting prefabricated foundation forms, another stripped forms, a third installed mud sills in wet concrete, while others installed girders, joists and sub-floor plates, or erected studs, ceiling plates, and other parts. Thus, the contractors were unconcerned whether a majority of their workmen were highly skilled so long as each man was competent in performing a specific task. Results of applying assembly-line methods to a large housing project proved highly satisfactory.



CONCRETE FOUNDATIONS and pier footings, with posts, girders and part of rough framing in place, are ready for erection of pre-cut lumber.

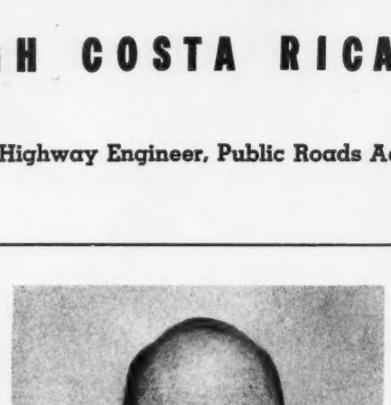
LUMBER STACKED ready for use by carpenters is moved from cutting yard by Hyster carrier (left) to nearby job-built gantry hoist (right) which lifts complete load on to truck.

Inter-American Highway

CUTS THROUGH COSTA RICAN MOUNTAINS

By J. L. HARRISON, Principal Highway Engineer, Public Roads Administration, Washington, D. C.

DESCRIBED HERE are many of the difficulties encountered on an especially difficult 71-mi. section of the Inter-American Highway through the Talamanca Mountains of Costa Rica. The Inter-American Highway, which extends 1,569 mi. through six Central American countries and is expected to be finished in fall of 1947, will link Mexico and the Panama Canal. The Costa Rican work is a joint project of the U. S. Public Roads Administration operating in cooperation with the local highway department. E. W. James is Chief of PRA's Inter-American Regional Office, Washington, D. C.



HIGHWAY ENGINEER with Public Roads Administration, J. L. HARRISON, is supervisor of work on Inter-American Highway.

CONSTRUCTION OF THE 71-MI. SECTION of the Inter-American Highway from Cartago to San Isidro in Costa Rica involves the most consistently heavy work which, within the knowledge of engineers connected with its construction, has ever been attempted in the highway field. Some 17,000,000 cu. yd. of material, an average of 240,000 cu. yd. per mi., must be handled. Construction of the most difficult single mile will require the movement of nearly 500,000 cu. yd. of material. The Ralph E. Mills Co., Roanoke, Va., is the contractor on this job, and M. L. Harshberger is resident engineer in Costa Rica for the PRA.

Route of Highway

In southern Nicaragua and for about 125 mi. into Costa Rica to the town of Esparata, the Inter-American Highway route follows the coastal plain (see map). At Esparata it turns into the foothills and, within a distance of about 20 mi., climbs some 4,000 ft. to San Ramon, a city on the Meceta Central plateau, the populous area of the country. From San Ramon to the Capital, San Jose, a distance of 47 mi., the road is on the plateau. Within the next 15 mi. it climbs another 1,000 ft. to Cartago, where the real climb into the Talamanca Mountains begins. This climb continues until a maximum elevation of just under 11,000 ft. is reached. The route runs for some miles near the tops of these mountains before the descent to San Isidro begins. From San Isidro to the Panama border, just short of 100 mi., most of the route lies in the General River Valley where relatively easy construction is expected. However, near the Panama border, a ridge must be crossed which is somewhat higher than the Blue Ridge Mountains in Virginia.

Originally, it was estimated that nearly half of the material to be moved would be rock. However, as often happens in the wet tropics, a large part of what was thought to be rock—or to overlie rock—has proved otherwise. Normally this would be considered most fortunate, but in the Talamanca Mountains there are places where the engineers wish that they had rock to deal with rather than the material they encountered. Sides of cuts made in rock can be expected to stay in place, which is more than can be said of many cuts made through the types of soils actually found.

While the fact that unusually large quantities of material must be handled in building this section of the Inter-American Highway is a matter of interest—unusual size always is of interest—it cannot be truthfully stated that size, in itself, is of sufficient importance to warrant extended comment. Rather, it is the problems that are correlated with size which attract attention. The enormous amount of work required in building this particular 71 mi. of highway is due to the peculiar pattern formed by erosion of the slopes of the mountain

OFFICIALS ON air inspection trip along Inter-American Highway are (left to right): RALPH E. MILLS, contractor; E. W. JAMES, chief Inter-American Regional Office, PRA; Maj. Gen. PHILIP B. FLEMING, FWA administrator; THOMAS H. Mac DONALD, commissioner of PRA; and MARVIN L. HARSHBERGER, PRA regional engineer in Costa Rica.

range (see accompanying illustration).

Nowhere in the United States would it be necessary to handle such large quantities of material per mile, for mile after mile, in order to construct a modern highway up the side of a mountain —not even in our worst mountain areas. The erosion with which we are familiar here produces much wider and less frequent gullies on mountain slopes. For the most part, in our mountain regions it is possible to locate a highway in these gullies and around the points which separate them, using curves which have radii long enough to comply with the modern standards of highway design. This cannot be done in the Talamanca Range. The gullies are too narrow and too sharp. To maintain proper standards of alignment it is often necessary to cut through the ridges and to fill across the gullies. This results in deep cuts and frequent high fills whereas, in this country, most of the line would be on side hill location.

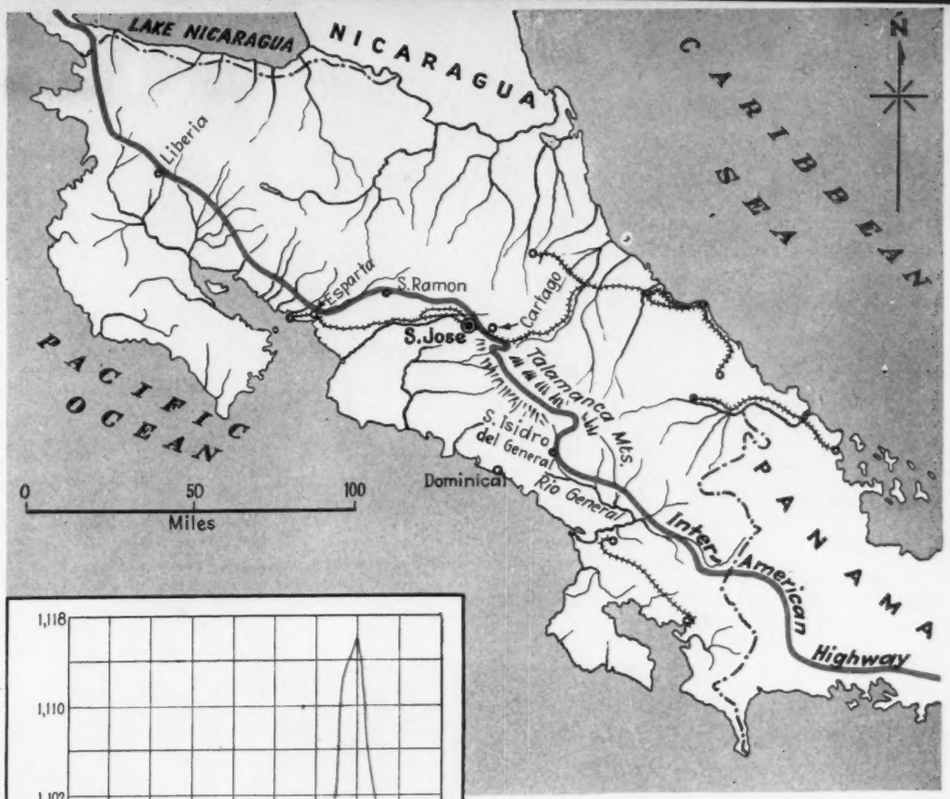
Deep Cuts and High Fills

The foregoing would not be a matter of much moment if it were not for two circumstances which are related to it. The first of these is that the cuts are often extremely deep—frequently more than 100 ft. The fills, naturally, are unusually high. The second is that these ridges are so steep that a tractor cannot climb them without a load—to say nothing of climbing them when pulling a pan! The natural slopes of these ridges generally have a gradient of over 40 percent and, not infrequently, as much as 60 percent.

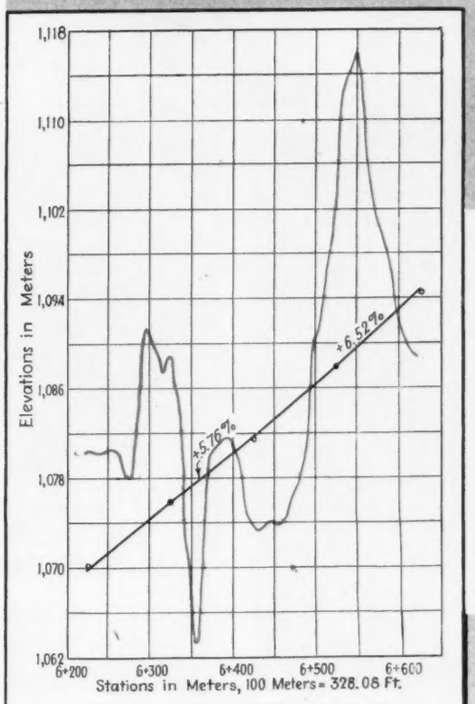
This, of course, means that before a cut through a new ridge can be started a pioneer trail must be opened up at a grade which the tractors can use in pulling themselves and their carryalls up into the cut! The tops of the ridges are not very wide so, as a rule, bulldozers are used to take out some of the material before the pans go to work. Even then, these pioneer trails must be used a great deal for, after each load, even the bulldozers must use them to "get back up" until construction progresses far enough to permit return travel over the graded roadway.

Slides Are Unpredictable

It is needless to remark here that neither highway engineers nor contractors have had a great deal of experience with deep cuts and high fills. True, in one place or another a good many have been built. Still the number of fills more than 100 ft. high and cuts more than 100 ft. deep, most engineers have constructed is small. As a result, information on how specific materials will behave when cuts of this depth are made through them, and how these same materials will behave in fills, is definitely limited. About all that can be said on this matter here is that there have been a lot of slides! This is not unusual in mountain country, still, on this project the slides have been more than ordinari-



INTER-AMERICAN HIGHWAY through Costa Rica.



PROFILE on center line of ¼ mi. of highway shows unusually high ridges and deep gullies encountered. Slopes of 1½ to 1 are common.

TORTUOUS ROUTE (below) of pioneer trail points out terrain features which necessitate many 100-ft. cuts and fills. Deepest cut on job is 200 ft.

MACHINE SHOP of Ralph E. Mills Co. at Cartego Plantel helps solve difficult spare parts problem. Established before war, shops are well equipped to handle major repairs. Equipment includes swing lathe, drill press, planer, 60-ton press, portable welders, air compressors, acetylene generator, jack bit grinder, battery chargers and an air furnace.

ly troublesome and, to make matters worse, they have been quite unpredictable. That is, ground which seemed likely to give trouble has stood while ground everyone thought would prove stable has developed slides—sometimes quite large slides.

It is, of course, well known that tropical soils usually differ from those common in this country. On this job rains keep everything well saturated at all times. The nature of the terrain makes it difficult to get rollers in to roll the fills as well as modern practice requires, but much of the material, as it comes out of the cuts, is so nearly saturated that there is reason to question whether rollers could compact it properly even if they could get to the fills in the earlier stages of their construction. In fact, 10-ton rollers were used on some of the work and were largely abandoned because they were too heavy. There was so much water in the material, as it came from the cuts, that rolling made it

TRACTOR-DRAWN SCRAPERS make use of pushers on return trips up slopes. High altitudes reduce efficiency of both men and equipment.

ROCK AND EARTH CUT MATERIAL is loaded into halftrack by 3½-yd. shovel at point 10 mi. north of San Isidro del General.

Public Roads Administration Photo

AGGREGATES FOR CONCRETE ABUTMENT (below) of Rio Ciruelas bridge north of Barranca, Costa Rica, are moved by wheelbarrow from stockpiles to mixer. Bridge approach will pass through rock ridge in background.

Public Roads Administration Photo

CUT AND FILL OPERATIONS involving tremendous earthmoving quantities are necessary to maintain curves with long enough radii to comply with modern highway design standards. Public Roads Administration Photo

act like a soft putty. At that, the fills have, on the whole, given less trouble than the cuts, but it is not yet certain how well they will stand in the future.

Mention has been made of the fact that this road crosses a mountain range in the wet tropics. The term "wet" should be underscored. During the whole of the year which ended about the first of last October, there were only 28 days during which no rain fell at the El Empalme Camp on the upper portion of this road. This record explains why the material being handled carries a high water content.

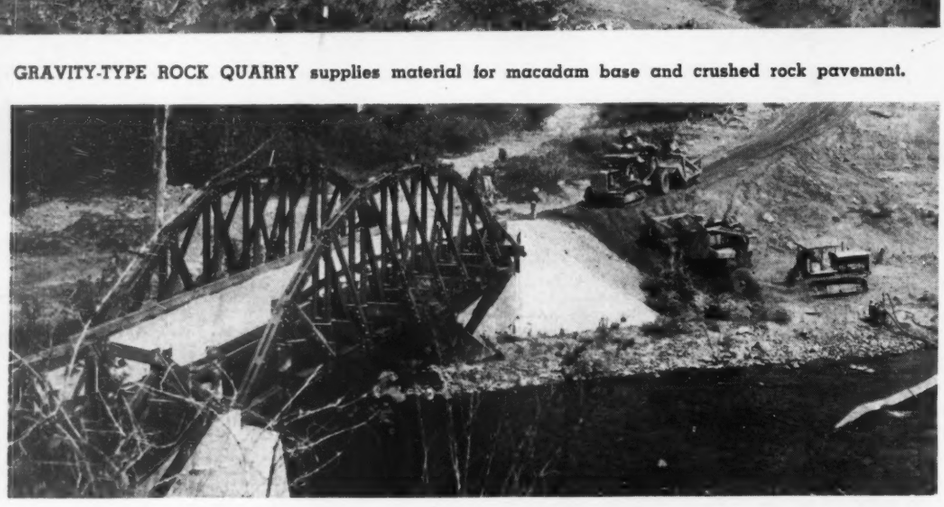
But neither the amount of work in making the deep cuts and high fills, nor the rain, bad as it is at times, have been as much of a problem as elevation has proved to be. At Cartago, the road is about 5,000 ft. above sea level. From there it climbs steadily until an elevation of nearly 11,000 ft. is reached. Some 20 mi. of it run as a sort of a "Sky Line Drive" near the top of the Talamanca Mountains before the descent into the General River Valley begins. Over this entire distance the road is at a high elevation—much of it at about 10,000 ft.

Now, the power plants which are used

LIGHT SEAL COAT of asphalt is applied by hand spray from pressure tank truck, a development which led to use of spray bars mounted on distributors.

COVER MATERIAL is placed over asphalt seal coat by dump truck equipped with tail spreader. 2-in. asphalt wearing surface will be added later.

GRAVITY-TYPE ROCK QUARRY supplies material for macadam base and crushed rock pavement.



RING-CONNECTED CREOSOTED TIMBER BRIDGE serves construction traffic during road-building operations on the Inter-American Highway. Public Roads Administration Photo

GRADING OPERATIONS in vicinity of Humo River, Costa Rica, involve steep grades at high altitudes which make earthmoving unusually difficult. Public Roads Administration Photo

on modern road-building equipment are designed to provide ample power at sea level and at elevations up to perhaps 3,000 ft. True, there is some loss of power even at 3,000 ft., but at an elevation of 10,000 ft. most power plants, whether they are gasoline or diesel, will produce less than 70 percent of their rated horsepower. There is almost always some loss in efficiency because of wear and improper adjustment of carburetors, timers and other devices, which may run as high as 10 or 20 percent. It is perfectly clear that construction equipment working at high elevations will not produce—in fact cannot be made to produce—as it is expected to produce when operating at or near sea level. This condition affects operation in various ways.

Tractors, for instance, cannot climb grades as steep as those climbed at sea level. Time is lost because return trips from the dump operation must be made in low gear. Fair loads can be taken on if a heavy pusher is used but they are seldom full loads. The result is a lower average load and an increased round trip time which cuts average hourly production and materially increases cost.

Altitude Affects All Equipment

Tractors have been mentioned but it must not be assumed that high elevation difficulty is confined to them. Altitude affects all equipment on which gasoline or diesel engines are used. It affects the operation of power shovels, trucks, compressors and other units just as much as it affects the operation of tractors. It also affects personnel. Men work more slowly—they accomplish less with greater effort. Most of them have to be taken to lower altitudes at regular intervals to recuperate—a month or so at high altitudes and a month at lower altitudes—to be kept in good condition. On the whole, men and machines alike produce little more than half as much at these high altitudes as is considered normal at ordinary altitudes.

It has been noted that there is little dry weather at the upper levels of the mountain range. This condition, alone, would present a difficult problem. When combined with high altitudes and the effect high altitude has on the efficiency of men and equipment, it is not surprising that production has not always been as high as had been planned. Still, in the best month, production has run as high as 750,000 cu. yd. which, of course, means that the job is well equipped and splendidly managed. The contractor—The Ralph E. Mills Company—has left nothing undone to perfect a first class working organization, to keep up morale and to keep things moving even when conditions were most adverse. Progress is steady in spite of the problems this highway has pre-

(Continued on page 180)

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Oral Variation

Tractor Conn was building a large apartment house and had sublet the foundation work to a subcontractor.

"You'll have to get a good surety to sign the contract with you," Conn stipulated, and the subcontractor named Henry Smith.

"Is Smith good for it?"

"Good as gold," was the positive reply. "He owns $50,000 worth of real estate and hasn't got the scratch of a pen against a thing."

"Bring him along and sign up," Conn proposed.

"Of course, I want you to agree not to come back on me, but to look to Smith if anything goes wrong," the subcontractor urged.

"Yes, I'll agree to that," Conn concurred. The subcontractor fell down on the job, Conn ascertained that Smith wasn't worth suing and entered suit against the subcontractor.

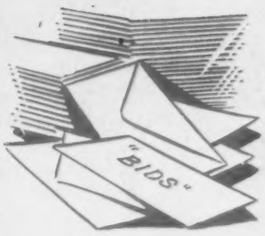
When the suit came to trial, the subcontractor went into the witness box, and started to tell of his agreement with Tractor Conn.

"I object, your Honor. The written contract must speak for itself and cannot be varied by verbal evidence of any different arrangement," Conn's lawyer objected.

"Objection sustained and evidence rejected," the Judge ruled—and the Judge was right.

"It is well settled that, as a general rule of law, oral evidence is not admissible to contradict or vary the terms of a written contract," says one state Court in laying down the general rule.

The Case of the Lowest Bidder



"All such contracts should be let to the lowest bidder," an Arizona law provided. An Arizona city called for bids on work based on certain specifications which contained a "freezing clause." Various contractors bid on that basis and the contract was awarded to Tractor Conn, the lowest bidder.

Then the superintendent of streets approached Conn.

"If the city will agree to cut out the freezing clause, how much will you pay for the concession," the superintendent queried.

"$4,700," Conn assured him and the agreement was reduced to writing. It was then claimed that this arrangement violated the Arizona law quoted above.

In ruling that this transaction was not allowable the Supreme Court of Nevada in 221 Pacific Reporter 834 said:

"Such a transaction destroys the whole plan of having work done by the lowest bidder, the only plan which protects the property owner from improvidence and fraud."

The Case of the Costly Oversight

"Make up the usual list of our personal property subject to taxation and deliver it to the city assessor not later than Saturday," Tractor Conn ordered.

A year later Conn ran across the carbon copy of the secretary's list, rang for that official, and pointed an accusing finger at the twelfth item.

"I notice that you listed in our tax statement the shovel that we ordered from the U.M.C.," Conn pointed out, "and that's the one on which we cancelled the order."

"It never entered the state, but was diverted to another buyer in Chicago," the secretary admitted, "but when I made up the statement the shovel was supposed to be on the way. After we cancelled the order I forgot to notify the city."

"Now it's too late to appeal to the board of equalization as provided by the law."

"I'm afraid it is."

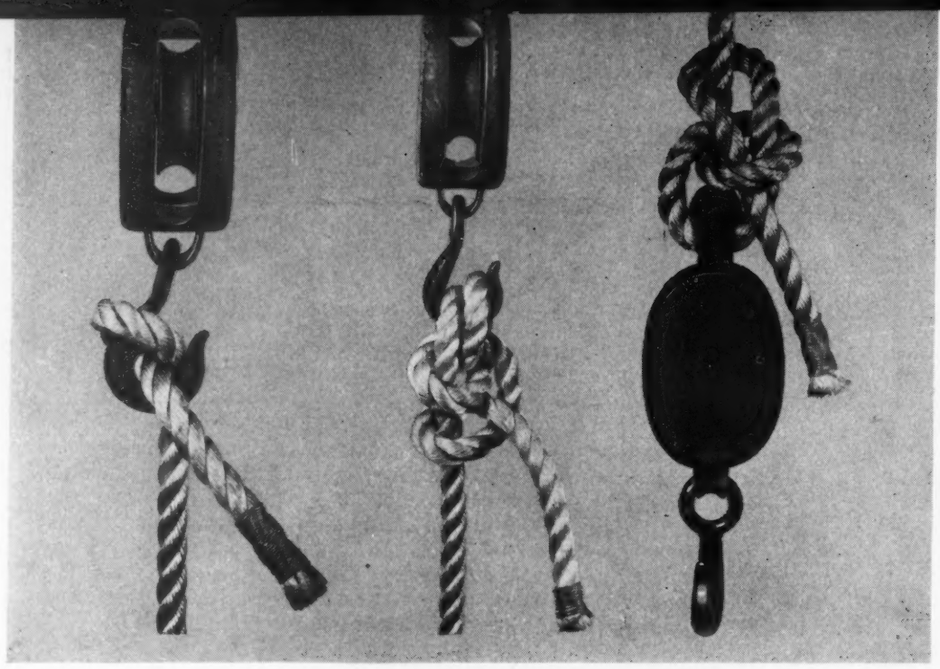
"All we can do is ask for an injunction to prevent the city from collecting that part of the tax and if we lose, the extra tax will be deducted from your salary," Conn decided.

"Ouch," was all the secretary could say.

Well he might say "Ouch," as the Supreme Court of Iowa in a case involving these facts and reported in 194 Northwestern Reporter 297, decided against Tractor Conn.

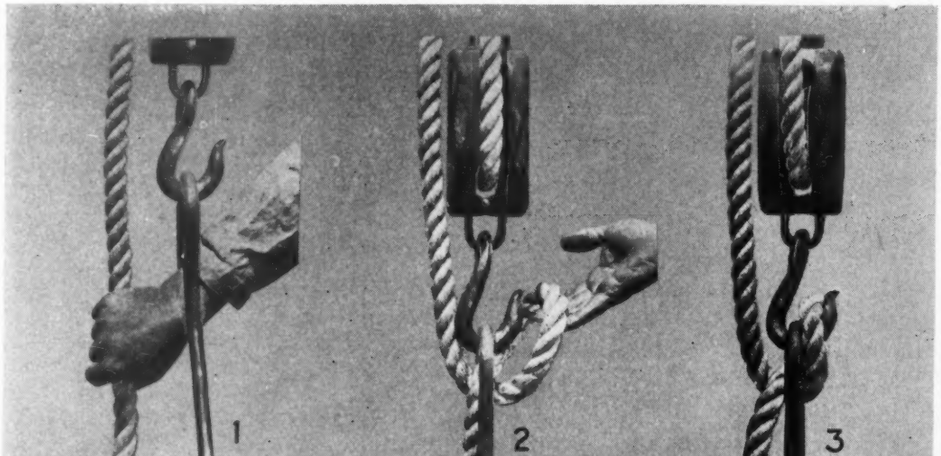
"This list was accepted and acted upon as correct by the assessor and by the board of equalization without objection, protest or appeal by Conn. Taxes for the current year were levied thereon and more than a year had elapsed when Conn first discovered the alleged mistake; not the mistake of the assessor, or of the board of equalization, or of the officers levying the taxes, but his own, in having given in for taxation more than the law required at his hands," said the Court. "To hold that an assessment so made is illegal and void and subject to be enjoined, would seem to involve a manifest absurdity."

More Legal Adventures of Tractor Conn Next Month



BLACKWALL HITCH (above, left), used only on hooks and rings, consists of loop with end of rope passed under standing part and across hook. Under load, hauling (standing) part jams end against hook. Hitch stays secure as long as load on line is constant. FISHERMAN'S BEND (center), useful knot for fastening rope to ring or hook, is preferred by many over blackwall hitch because it locks itself when free or under load. It is made by taking two turns around hook, then half hitch around standing part of rope and between hook and turns, with final half hitch around standing part. BOWLINE KNOT (right) is tied by laying end of rope across standing part, forming loop (around end of rope) in standing part, then leading end of rope around standing part and down through loop again.

Photos, National Lead Co.



Proper Use of *Rope*

Promotes Safety and Conserves Material

PROPER USE OF ROPE on the job is important not only for conservation of material but for safety as well. With most contractors, ropes, blocks, swing stage irons and cornice hooks are important tools of their trade. Negligence or carelessness in the use of these tools may result in unfortunate and costly accidents.

Prior to use on the job every piece of gear—ropes, blocks, irons, planks, rails, etc., should be inspected. Every item on which safety depends should be carefully examined. Workers, painters especially, should know how to tie at least a half dozen knots. Those most frequently used on a job are shown in the accompanying illustrations. Also illustrated is the step-by-step procedure for reeving off a set of blocks, to be used as part of a swing staging assembly. To the experienced rigger or painter, this operation should become as simple as threading a couple of needles.

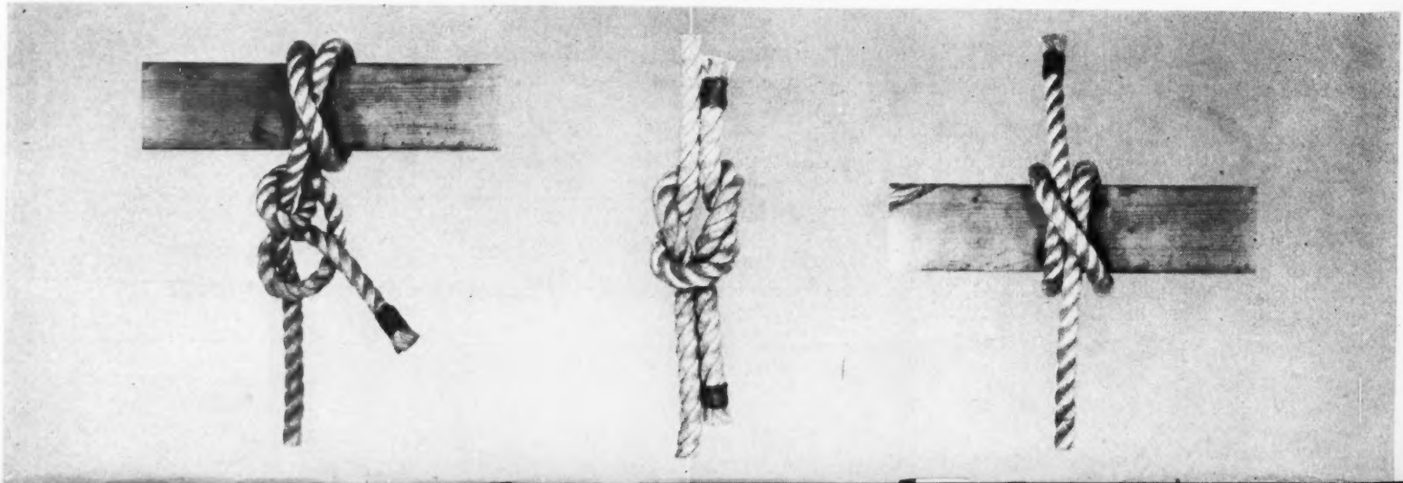
←

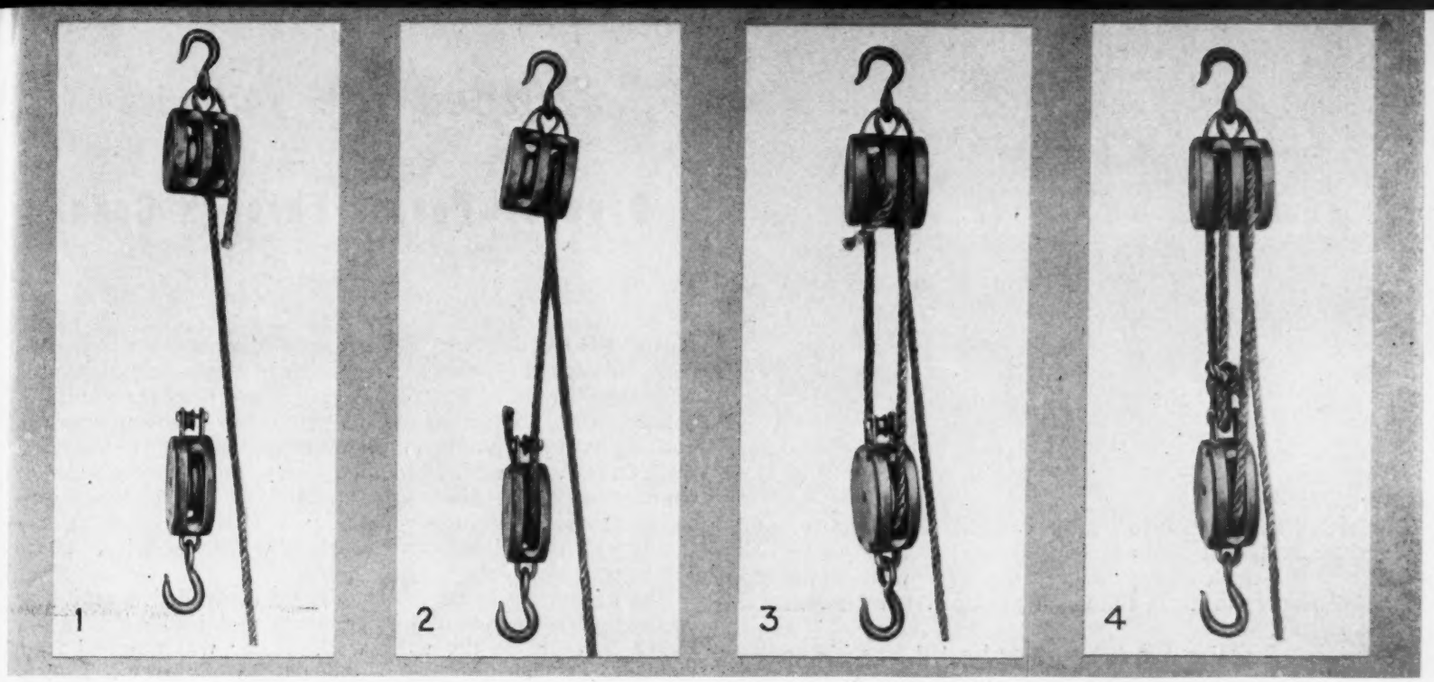
SWING STAGE HITCH (left) is regarded as only safe and secure hitch to employ at this critical point, and is one that may be quickly cast off. Hitch is made as follows: (1) Reach through stage iron with hand and grasp rope which hangs from double block. (2) Pull rope through iron below hook, turning hand to right and lifting to form loop. (3) Drop loop over hook. Hitch is so formed that weight of swing stage locks it securely.

HALF HITCH DOUBLE (below) is used chiefly for making end of rope fast, around its own standing part. It should never be used for hoisting timbers. To tie double half hitch, make round turn over timber, then make two loops around standing part of rope.

SQUARE KNOT (below) is easily tied by taking ends of rope, passing left end over and under right end, then passing right end over and under left end. When properly tied, two rope ends lie on same side of two standing parts, as shown. Square knot holds more firmly as load is applied.

CLOVE HITCH (below) for fastening rope around pole, post or timber, is also called "builders" hitch because it is widely used in fastening staging to upright posts. Pass end of rope around timber, then over itself and between rope and timber. Hitch locks securely when load is put on line.





REEVING OFF SET OF BLOCKS is shown here step-by-step: (1) Blocks are laid on ground, several feet apart and end of rope is passed through double block. (2) Rope is drawn through single block. (3) Rope end is run through other half of double block. (4) End of rope is drawn through and around thimble ring on single block, as indicated. (5) Rope end is secured above thimble ring by means of eye-splice, if possible. If this is unfamiliar procedure, tie bowline knot in rope just above thimble; then bind free, short end of rope with wire or stout twine to standing part of rope.

Special Tip on Automatic Torch

HEAT-TREATS SNOW PLOW BLADES

BY USING A COMBINATION TIP which projects a flame brush followed by a water spray, the equipment maintenance shop of the New Hampshire Department of Highways at Concord, N. H., is able to heat-treat snow plow blades mechanically at a speed of 7 to 8 ft. per min. with an automatic electric-motor-driven traveling gas torch. The combination tip, mounted on an Oxweld machine in position to cast a lateral brush and spray, is divided into two vertical compartments, each equipped with double rows of perforations for gas or water jets. Oxygen and acetylene are fed to the forward compartment through conventional attachments, and water is supplied through a hose connection to the rear compartment.

As a wartime conservation measure,

(Continued on page 142)

MECHANICAL HEAT-TREATMENT (below) of snow plow blade (built up of salvaged soft steel plate) is accomplished by motor-driven traveling torch with special combination tip which furnishes both hot oxyacetylene flame and cool water spray. Snow plow blade is clamped to I-beam jig parallel with track of automatic carriage. Cooling water falls into large trough under jig.

WATER SPRAY (below) from rear perforations of combination tip quenches steel plate heated by brush of flame issuing from forward perforations of same tip.

Step-by-Step

FIELD METHODS

Tipped for Transit

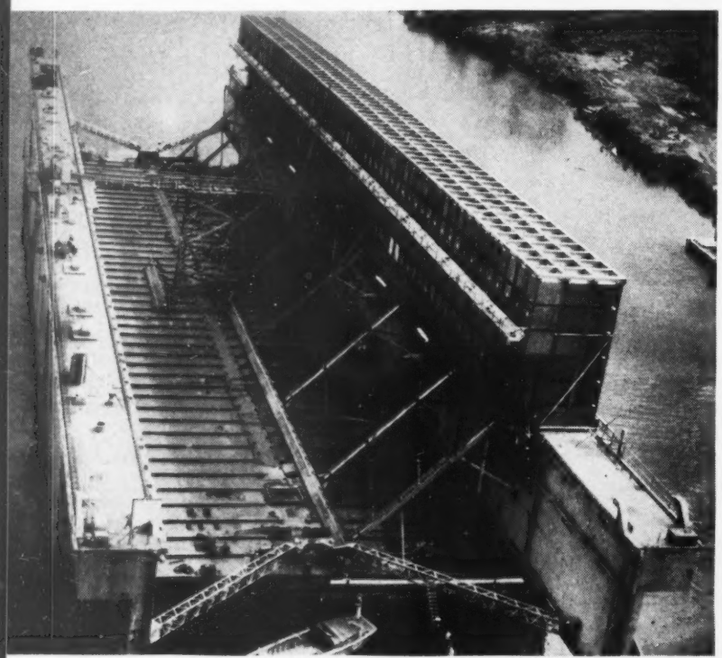
Drydock Passes Through Canal

TOO WIDE TO PASS through the Panama Canal and too ungainly to be towed around South America, sections of the Navy's 18,000-ton capacity floating drydocks were tipped on their beam ends to make the canal passage from the Atlantic to the Pacific.

The task of getting the 400 ft. long by 124 ft. wide center sections of these steel units through the 110-ft. wide canal was assigned to the Bureau of Yards and Docks. Credit for the unusual achievement is shared by Frederick R. Harris, Inc., designers of the dock, who made the plans for the work; Pacific Bridge Co., who acted as consultants on the marine work and welding; and a detachment of Seabees, experienced with pontoon gear, who did all of the work in the field.

For loading control on the side which was to be submerged, cellular 5x5x7-ft. pontoon units were welded on top of one wing wall. Other units were added using only the regularly supplied connections of the pontoon gear. Bracing was installed as a safety measure from the pontoon deck of the drydock to near the top of the loaded wing wall to withstand winds up to 110 mph.

The drydock was rolled 90 deg. by controlled pumping of water into its pontoon compartments and into some of the 5x5x7-ft. units on the wing wall. Water was pumped from the drydock's compartments under the concentrated load of what was once its deck, to provide buoyancy. The pontoon units were then partly filled to assure continued stability against overturning in transit.



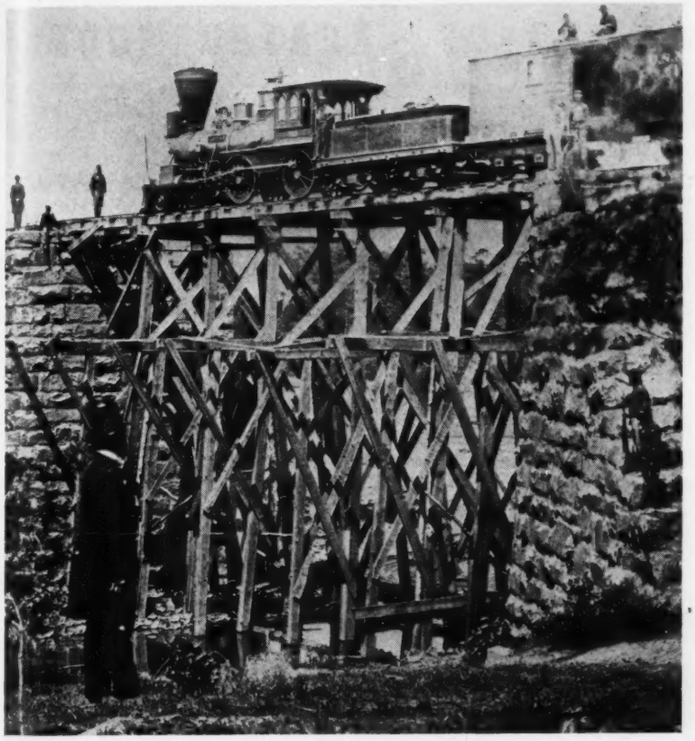
400-FT. CENTER SECTION of floating 18,000-ton-capacity drydock (with 90-ft. end sections removed) is prepared for turning on beam end for transit through Panama Canal. Six-story tier of standard 5x5x7-ft. pontoon units, made up with regularly supplied connections, is welded to wing wall.

2 20-DEG. LIST is result of 2 hr. of carefully controlled pumping of water into pontoon units on wing wall. Water is pumped from drydock compartments to provide buoyancy under concentrated load of deck as drydock turns on its side.

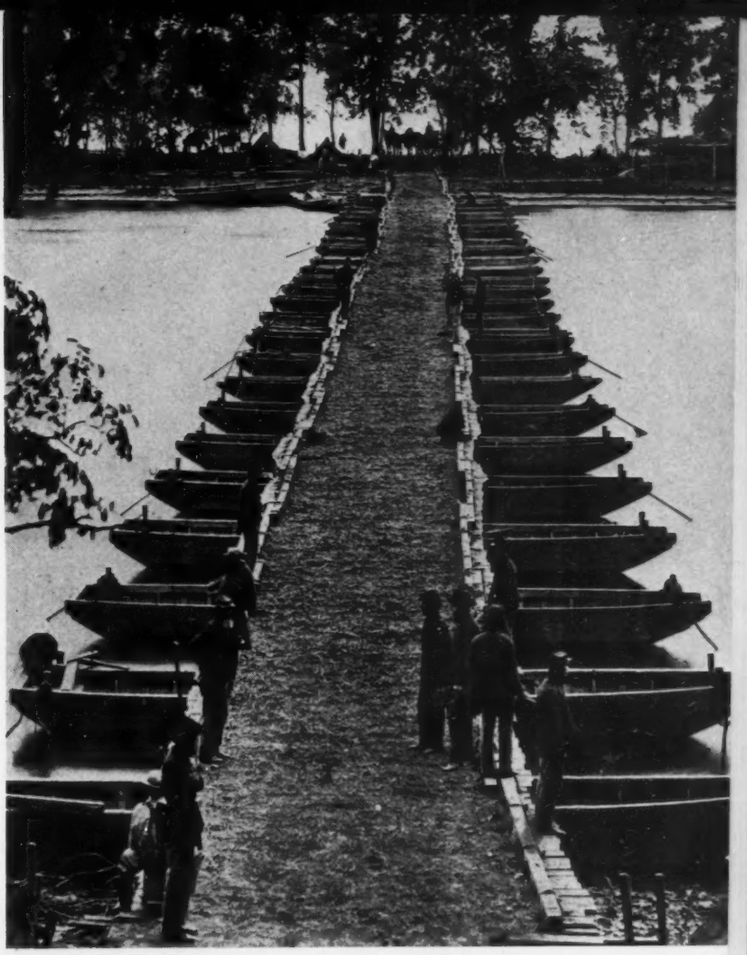
3 ON BEAM END, drydock with added pontoons has only 54-ft. width. Stability is maintained during transit by partly filling small pontoons to give vessel draft of 10½ ft. To right drydock water is blown from cellular units and main compartments are flooded.

Civil War Bridges

Are Progenitors of Modern Military Structures

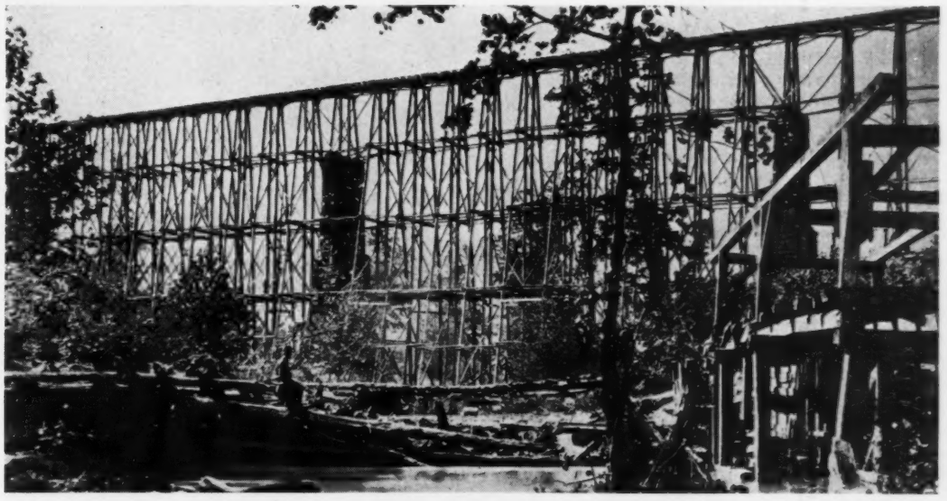


MILITARY RAILROAD crosses stream on timber bridge reconstructed between stone abutments by Army Engineers during Civil War.



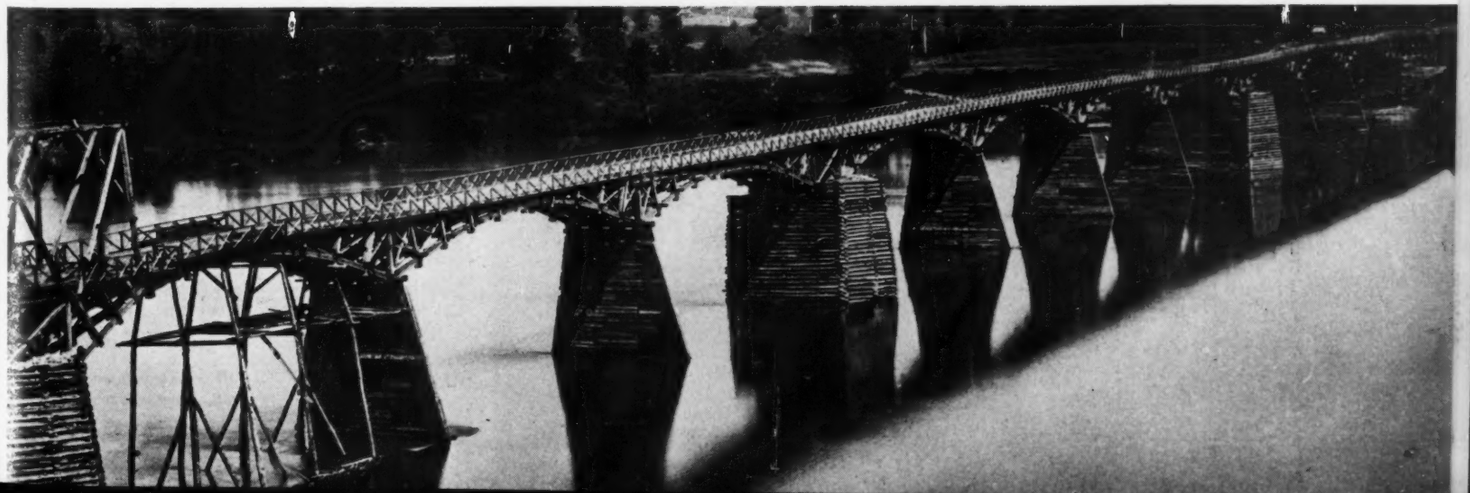
CIVIL WAR BRIDGE across James River in Virginia is supported by wooden pontons resembling plywood units employed for many floating bridges in World War II.

Signal Corps Photos from Brady Collection on Civil War



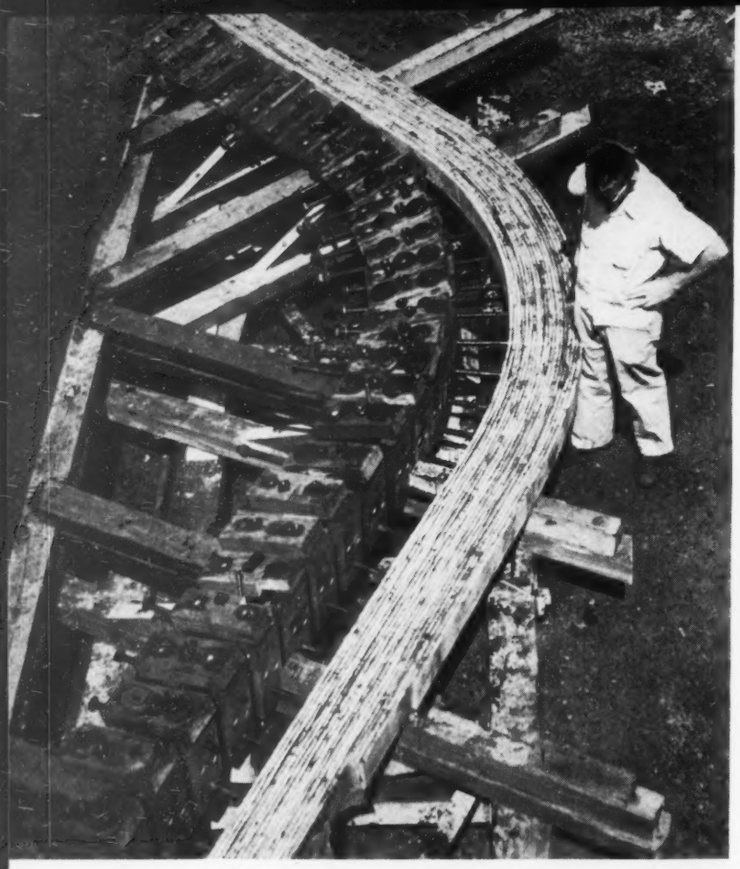
RAILROAD TRESTLE is rebuilt by Corps of Engineers for use in Civil War.

U. S. ARMY ENGINEERS constructed this multiple-arch military bridge (below) supported by stone-filled cribs and pile bents across Tennessee River at Chattanooga in 1863.



Glued, Laminated Arches

BUILT OF TREATED WOOD

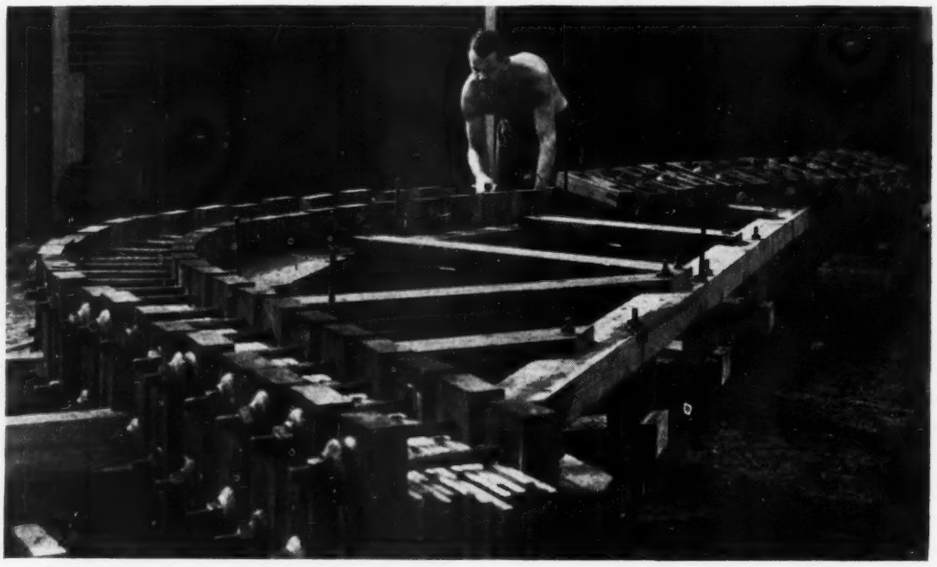


GLUED, LAMINATED THREE-HINGED ARCH CONSTRUCTION employing wood pressure-treated for durability and fire resistance provides required headroom of 15 ft., with lower side walls and less cubage, in a new 30x40-ft. repair shop for locomotives at the treating plant of the American Lumber & Treating Co., Gainesville, Fla. Six three-hinged arches of 30-ft. span spaced on 8-ft. centers for the structure were fabricated, in half sections, of 1x6-in. S4S lumber. Arch laminae 26 ft. long were made by joining end to end, by means of glued scarf joints having a slope of 1 in 12, boards dressed for a smooth glue surface.

Two permanent forms used for clamping the arch sections were mounted on trams so that they could be moved in and out of the kiln. Pressure was applied by hand-operated screw clamps on 8-in. centers, each clamp having a pair of 1-in. bolts. The pressure was calculated to be 150 to 200 psi. With all the bolts tightened, the assembly was moved into the kiln for the curing period to develop a waterproof bond.

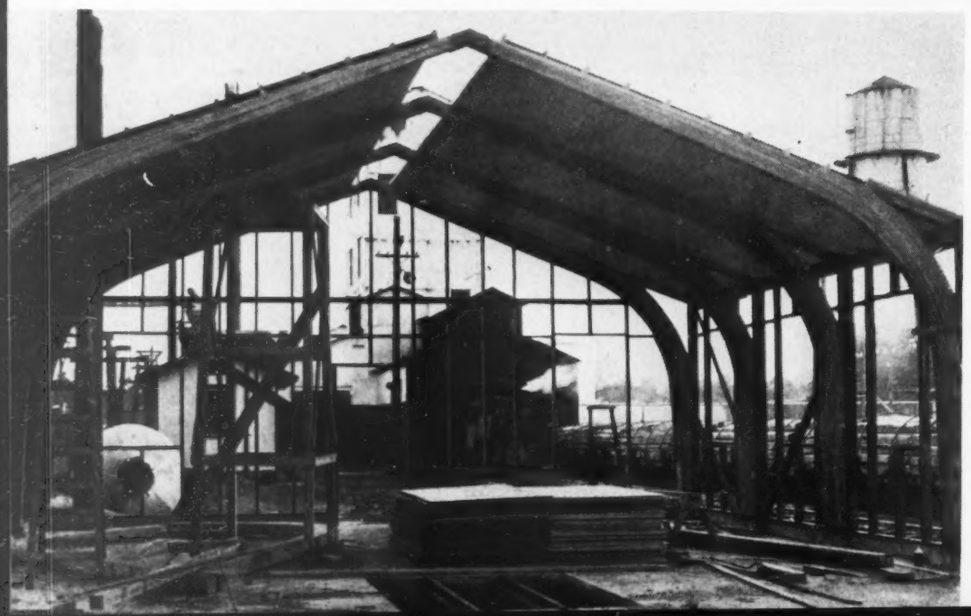
Completed arch sections were planed and sanded to remove excess glue and then were framed. Steel plates were attached to the bases of the sections, after which they were raised in place and joined at the top with splice plates. The side walls and roof were made of 2x4-in. framing material and ⅜-in. thick plywood, all of which was pressure treated. The building is roofed with asbestos shingles on top of plywood. Both the interior and the exterior are painted with aluminum paint trimmed in black.

FINISHED HALF-SECTION of glued, laminated three-hinged arch is removed from form.



CLAMPS ARE TIGHTENED in forms for arch section after glue has been applied to 26-ft. lengths of 1x6-in. lumber. Form is mounted on tram car for running in and out of curing kiln.

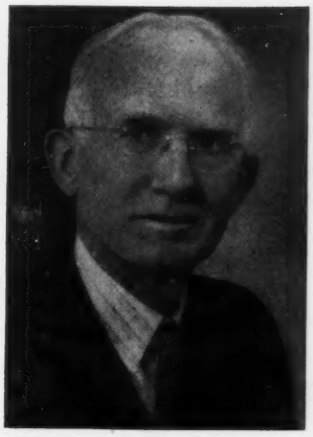
ARCH SECTIONS, fitted with base sections of steel plate, are set on anchor bolts, and two halves of each arch are joined at top by splice plates.



Division Engineers for Public Roads Administration

HEADS OF TEN NEW PRA DIVISIONS, selected as part of Federal Works Agency reorganization program, are pictured here, along with Dr. L. I. Hewes, chief of western headquarters, who is in general charge of Divisions 7, 8 and 9. States covered by each division are listed.

L. I. HEWES
Chief, Western Headquarters
San Francisco
Divisions 7, 8 and 9

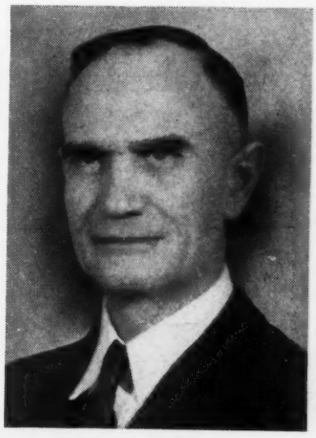


C. C. MORRIS
Division 7, San Francisco, Calif.
Arizona, California, Nevada, Hawaii

W. H. LYNCH
Division 8, Portland, Ore.
Montana, Oregon, Idaho, Washington, Alaska

B. W. MATTESON
Division 9, Denver, Colo.
Colorado, New Mexico, Wyoming, Utah

J. A. ELLIOTT
Division 6, Fort Worth, Tex.
Arkansas, Louisiana, Oklahoma, Texas



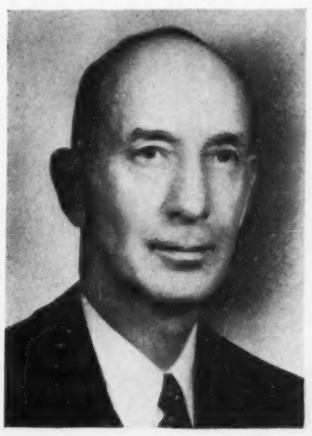
CLIFFORD SHOEMAKER
Division 5 South, Kansas City, Mo.
Iowa, Kansas, Missouri, Nebraska

SAMUEL TAYLOR
Division 5 North, St. Paul, Minn.
North Dakota, South Dakota, Minnesota, Wisconsin

J. T. VOSHELL
Division 4, Chicago, Ill.
Illinois, Indiana, Kentucky, Michigan

B. P. McWHORTER
Division 3, Atlanta, Ga.
Alabama, Florida, Georgia, Mississippi, Tennessee, North Carolina, South Carolina

C. E. SWAIN
Division 2, Washington, D. C.
Delaware, Maryland, Ohio, Pennsylvania, District of Columbia, Virginia, West Virginia



A. G. BRUCE
Division 1, Albany, N. Y.
Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey

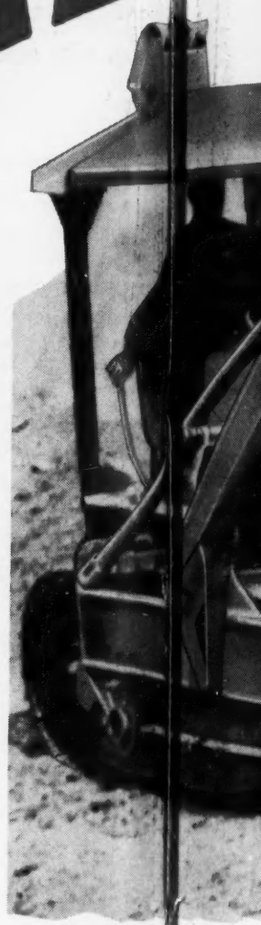
One man GANG

Combine the sure-footed power of an Oliver "Cletrac" crawler tractor with the versatility of a Sargent overhead shovel and you get a one man construction crew that really speeds job progress.

You get maximum traction to crowd backwards into the pile and get a full dipper every time . . . to speed forward and discharge fast . . . even in the muddiest going.

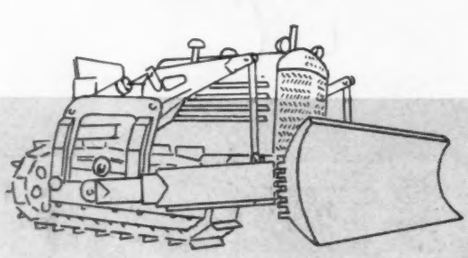
This "one man gang" speeds loading out trucks . . . stripping loam or overburden . . . handling snow removal . . . digging foundations . . . tearing up and loading out old cobblestone or black top street surfaces . . . or on any job that calls for a speedy, powerful tractor shovel. And in a very few minutes a cable operated bulldozer or angledozer can be attached for grading or spreading operations. It's an all purpose unit . . . tractor, loader, angledozer, or tractor shovel.

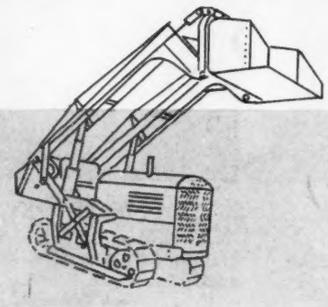
For complete information on the "one man gang" that can help step up the pace of your jobs, see your Oliver "Cletrac" dealer. Substantial numbers are now being released for essential use. Your dealer will gladly assist you in making application. **The OLIVER Corporation,** 19300 Euclid Avenue, Cleveland, Ohio.

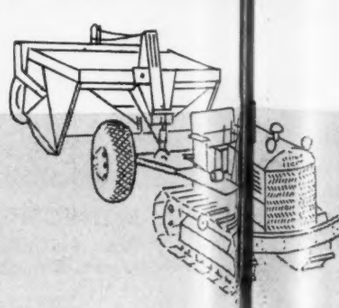


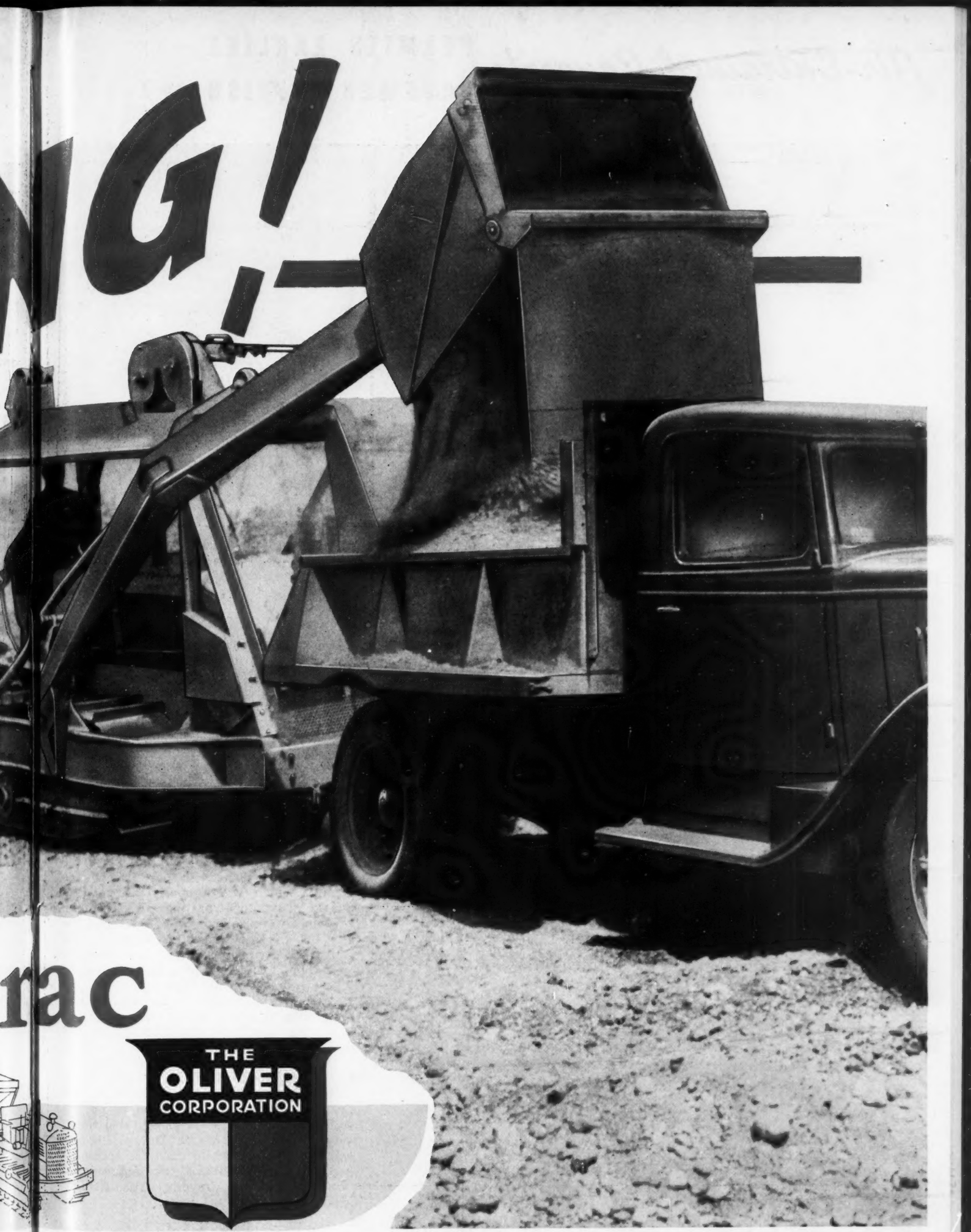
ARMY E NAVY

OLIVER-Cletra





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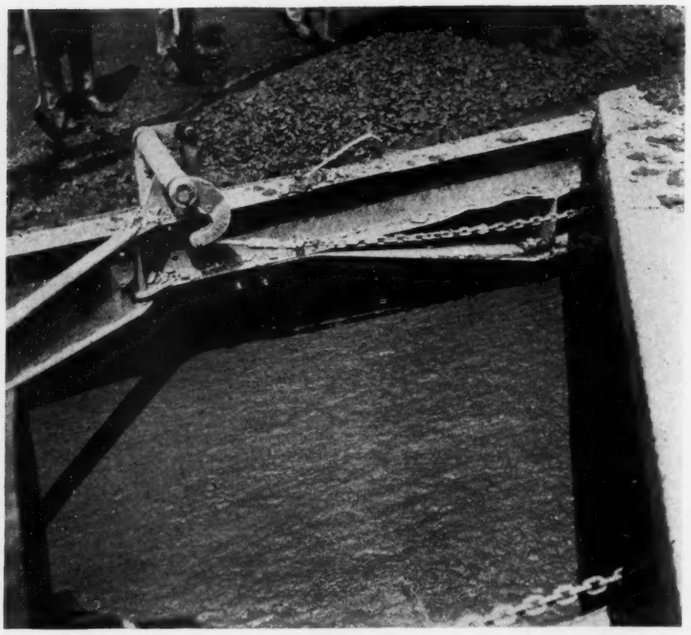
THE
OLIVER
CORPORATION

Air-Entrained Concrete PERMITS EARLIER PAVEMENT FINISH

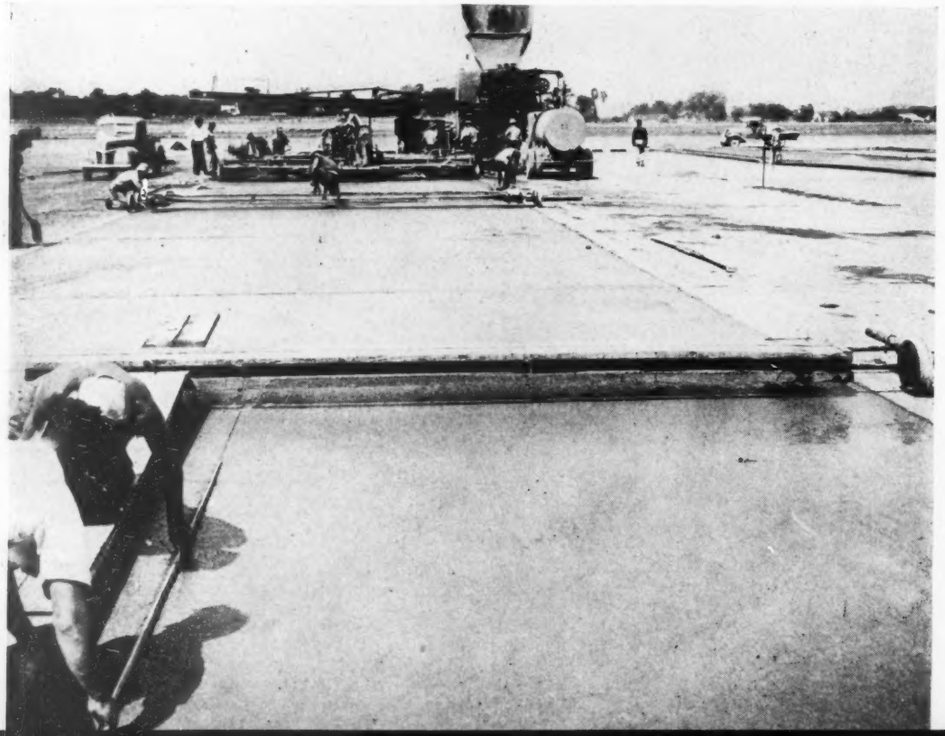
PLASTICITY AND GENERAL COHESIVENESS, indicated by steep rounded edge of concrete mass, are characteristics of concrete mixture made with air-entraining cement.



ONLY ONE PASS of single-screed finishing machine is necessary to strike off concrete ready for hand finishers. Surface texture indicates plasticity of mixture.

SAVINGS IN OVERTIME WORK for pavement finishers and curing crews on concrete slab containing air-entraining cement have received added verification from the experience of L. G. DeFelice & Son, Inc., New Haven, Conn., on a $1,169,000 paving contract for the U. S. Engineers at the Army's Stewart Field, Newburgh, N. Y. Accompanying photographs show how closely finishers followed the paver on this contract, allowing curing compound to be applied to the finished surface within a comparatively short time after concrete was placed.

ABSENCE OF BLEEDING makes it possible for finishing operations to follow closely behind paving mixer, eliminating any need for long overtime by finishers at end of day.



These advantages resulted from the almost complete elimination of surface bleeding and segregation in the concrete, a condition obtained through the inclusion of the proper amount of air-entraining agent in the cement. An air-entraining agent in the proportions set by U. S. Engineer specifications was interground with the cement at the mill. When the concrete was mixed on the job, this agent introduced minute air bubbles into the mixture and reduced the weight of the concrete by about 4 lb. per cu.ft. In the mix, which was properly designed to take advantage of the air-entraining property, entrained air bubbles had the effect of increasing the plasticity and workability of the concrete and eliminating, or drastically reducing, the bleeding and segregation.

Coarse aggregate for the mixture was crushed trap rock in two separate gradations having maximum sizes of 2 in. and ¾ in., and the fine aggregate was crushed dolomite sand. Using air-entraining cement in a ratio of 6 sacks per cubic yard, the concrete weighed about 155 lb. per cu. ft. With the same ratio of normal portland cement, tests showed the weight to be 159 lb. per cu. ft. Duraplastic air-entraining cement to meet the specifications for this contract was produced and supplied by the Universal Atlas Cement Co.

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

J&L
PERMASET
WIRE
ROPE

Precisionbilt and Pre-formed for long, profitable service • J&L builds wire rope as a fine piece of machinery — builds it as a precision product like a fine stop-watch.

From raw materials, through the making of the steel, drawing the wire, and building the rope, every step is J&L — controlled for quality all the way.

Wire rope so made — by men of skill on modern machines — and pre-formed to install more easily, work better, resist fatigue, naturally lasts longer, serves you better, pays higher dividends on your investment in equipment.

J&L STEEL

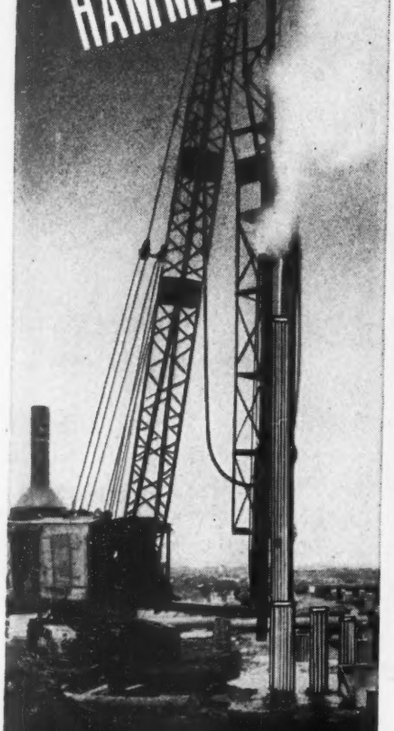
JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

DOUBLE-ACTING UNION HAMMERS . . .



ALL the essential facts about Union double-acting hammers and how they increase the efficiency of all your pile driving jobs, are contained in our Catalog No. 184. Write for it today.

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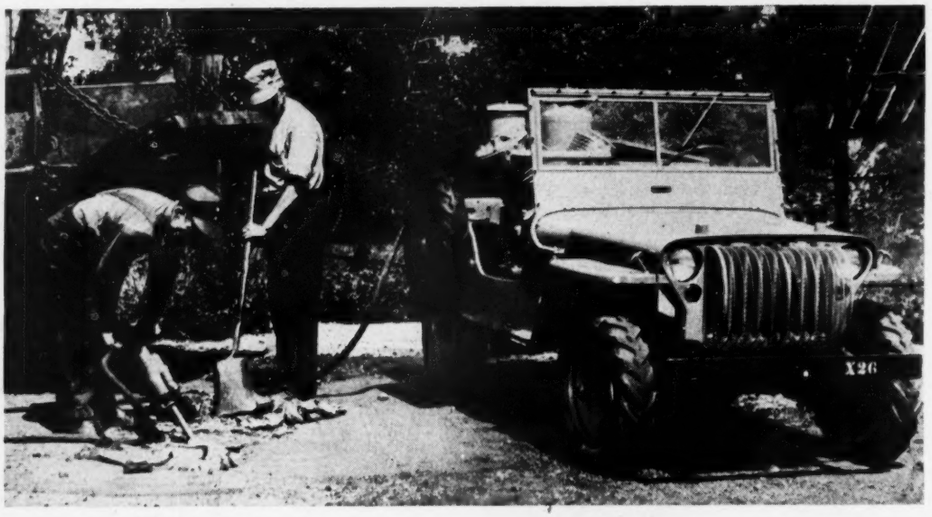
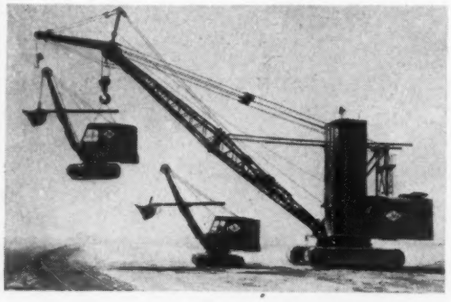
CONSTRUCTION EQUIPMENT NEWS

AUGUST, 1945 REVIEW of Construction Machinery and Materials



POST-WAR JEEP has special power take-off which can be used with spline shaft for direct power or with belt pulley, thus making it possible to supply up to 30 hp. for operation of various kinds of equipment. Changed gear ratios in transmission, transfer case and axles result in maximum efficiency while operating either at a pace of 3 to 7.5 mph., or at a road speed of 60 mph. Other differences from military Jeep: (1) New combustion chamber, increasing power; (2) radiator shroud providing more effective cooling for continued low-gear driving; (3) larger clutch to take care of increased loads; (4) redesigning of steering linkage to provide ease of handling and free rolling; (5) reinforcement of chassis frame to assure greater rigidity; (6) rear shock absorbers mounted at angle to provide level floor; (7) gear shift lever placed on steering column for greater convenience. Special equipment for Jeep includes capstan winch with 5,000-lb. line pull mounted on frame between bumper and radiator and driven from front end of engine crankshaft.—Willys-Overland Motors Inc., Toledo, Ohio.

★ ★ ★



COMBINATION CRANE, SHOVEL AND DRAGLINE, known as Type 2000, has a lifting capacity of 100 tons as a crane and a capacity of 5 cu. yd. when equipped as a shovel or dragline. Drums in tandem differentiate this from other Lima models. It is equipped with air control which greatly simulates smooth, quick and positive movement of steam power. Ease of movement said to result in greater output and less effort on part of operator. Long, wide crawlers effect low bearing pressure and maximum stability when working in, or traveling over wet or uneven ground. Powered by diesel or electric unit and may be converted in the field from one combination to another without major dismantling. — **Lima Locomotive Works, Lima, Ohio.**

Easily Operated in the Roughest Going!

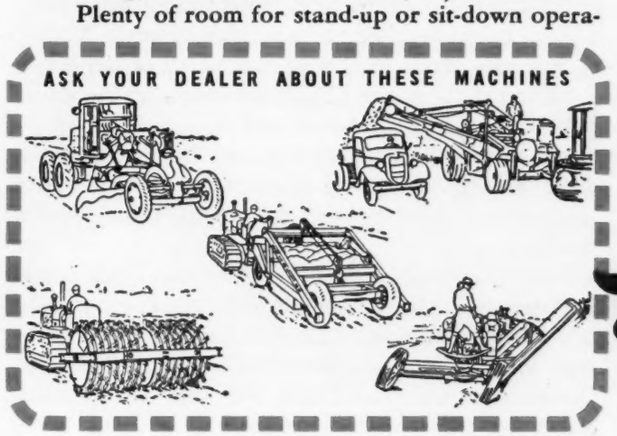
Yes, Adams Motor Graders are engineered for fast, easy operation—even in the roughest kind of going. Here are just a few salient features:

● **Efficient Push-Button Starting Arrangement:** Starts heavy-duty Diesel engine quickly, easily—regardless of weather or temperature—right from the cab.

● **Big, Comfortable Cab:** Wide, adjustable seat—Plenty of room for stand-up or sit-down operation—All operating controls within easy reach.

● **Positive Mechanical Steering System:** Mounted throughout on anti-friction bearings—Provides easy steering with *safe control* under all conditions—*at all speeds.*

Ease of operation is just one more reason why rugged, multiple-duty Adams Motor Graders are the wise choice for high-speed efficiency and economy. Ask your local Adams dealer for convincing proof.



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Sales and Service Throughout the World

Adams

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

FREIGHT RATES *and* INDUSTRY LOCATION

A SIGNIFICANT decision, announced by the Interstate Commerce Commission last May, will take preliminary effect on the 30th of August. It will eliminate some of the advantage in freight rates which Eastern shippers have enjoyed over shippers of the South and West.

The decision has been enthusiastically hailed as an Emancipation Proclamation for industrial development in the South and West. It has also been roundly condemned as a meddlesome control measure that ignores valid differences in haulage costs, and recklessly blots out one of the important factors in determining the location of American industry.

Cooler appraisals indicate that the net effect of the rate changes will be far less drastic than predicted by the more passionate advocates or adversaries. Nonetheless, it is important for the business world to be informed both upon the principle at issue, and upon the forseeable consequences of the ICC ruling.

What The Decision Calls For

The Commission's order, unless modified, or successfully contested in the courts, will require: (1) the eventual establishment of a single freight classification, or grouping of commodities for rate-making purposes, for application throughout the United States; (2) a single level of *"class rates"*—or rates established for groups of commodities and primarily applying to manufactured and semi-manufactured articles of high value—in the area east of the Rocky Mountains. This level is to be about 15 per cent higher than the present Eastern scale.

Because it will take some time, probably several years, to work out a uniform classification in place of the three major classifications now existing, a preliminary adjustment is provided.

Under this adjustment the existing classifications will remain in effect, but the rates on articles moving on *class rates* will be increased 10 per cent in Eastern or Official Territory—the area east of Lake Michigan and the Mississippi River and north of the Ohio River. On the other hand, the rates will be reduced 10 per cent on articles moving on class rates in the South and West, and on those moving interterritorially.

What The Problem Was

At the present time there are marked differences in the levels of the basic scales of class rates in the five major rate territories—Eastern or Official, Southern, Western Trunk-Line, Southwestern, and Mountain-Pacific. It is difficult to average the levels of rates, but if the level of the class-rate scale in Official Territory is taken as 100, the levels in the other territories may be roughly considered as follows: Southern, 139; Western Trunk-Line, 128, 146, 161, 184 in Zones I, II, III, and IV, respectively; Southwestern, 161; Mountain-Pacific, 166.

These are over-all comparisons. On many individual articles the differences in levels of rates are greater or less than indicated because of offsetting differences in regional classification schemes. In many cases, the use of exceptions to the classifications and of special commodity rates has reduced the regional disparity in rates. In fact, on some articles, particularly on certain low-grade traffic such as logs, pulpwood, bricks, coal, sand and gravel, the South and the West have actually had lower rates than Official Territory. The rate disadvantage of the South and West has been principally on manufactured articles.

The territorial differences in class-rate levels have complicated the problem of constructing rates from a point in one territory to a point in another. Today, such a rate tends to represent a blend of the levels in effect at the place of shipment and at the destination. Thus manufacturers and dealers in a higher-rated territory are likely to see themselves at a disadvantage when they attempt to sell goods in a lower-rated territory against competition located there.

Now, if differences between territorial rate levels are removed, the *inter*territorial freight-rate problem largely disappears. So it is an important question whether such differences are justified. The Commission has found that they are *not* justified either by differences in transportation costs or by

other valid considerations. From that finding came the order to establish a uniform level of class rates and a single freight classification.

The Decision And The Map Of Industry

What effect will this decision have on the location of industry in the United States; and what effect will it have on the economic development of the East, the South, and the West?

Today, many in the West and South believe that their higher class rates have seriously retarded the industrial development of these areas, and promoted the concentration of manufacturing in Official Territory. They point out that Official Territory has over 50 per cent of the population of the country, had nearly 70 per cent of the persons employed in manufacturing in 1940, and accounted for nearly 73 per cent of the "value added by manufacture" in 1939. Boasts of industrial development in the South, and to some extent in the West, in recent years are accompanied by claims that this would have been greater but for the freight rate structure.

Another point gets into the argument. Official Territory is not only the country's most highly industrialized section, but also its greatest consuming territory. It is the market which nearly all manufacturers desire to reach, particularly when they have a surplus to sell. Here again is occasion for an outcry by producers outside of Official Territory against the consequences of their high rate levels and the levels of interterritorial rates. Under the circumstances it is not strange that the South and West have argued long and volubly for mile-for-mile equality in rates.

Those in Official Territory deny that the South and West have been handicapped by the rate adjustment, but at the same time look with apprehension at the loss of their rate advantage.

What's The Effect?

However, now that the ICC's ruling is about to be put in operation, it is time for the colorful statements of the debating period to give way to a sober appraisal of what the consequences are likely to be.

In the first place, it should be noted that the preliminary adjustment will affect only a small fraction of the traffic. Estimates indicate that only about 4 per cent of the full-carload traffic moves on regular class rates. About 11 per cent moves on exception ratings which are not affected by the preliminary order; and about 85 per cent moves on commodity rates, which were not within the scope of the Commission's decision. The proportion of less-than-carload lot traffic affected is much greater, since a large part of it moves on class rates; however, less-than-carload traffic constitutes less than 1½ per cent of the total tons carried.

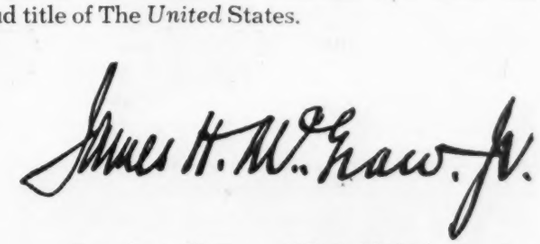
The permanent rate structure will probably affect more traffic than the preliminary order since, in the establishment of a uniform classification containing more classes than at present provided, many articles now moving on exception ratings are likely to be brought within the scope of the classification, and the same may be true of some articles moving on commodity rates.

But, even if a large proportion of the traffic were affected by the Commission's order, or if the principle of equality in rate levels is eventually extended to much of the traffic moving on commodity rates, these freight-rate adjustments cannot be expected to revolutionize the pattern of industrial location in the United States.

It seems evident that most industries now found in Official Territory are located there for other advantages than that of a lower level of freight rates, undeniable as such an advantage is. Insofar as that is the case, they have little to fear from equalization of the rate levels. For those which have, indeed, been dependent upon preferential rates and otherwise badly located, the removal of the preference and their consequent shift to some area possessing a real locational advantage would be desirable from the point of view of the national economy.

While the high degree of industrial concentration in Official Territory does not rest on such a flimsy basis as a lower level of class rates, the Commission's decision does remove one existing handicap to the growth and development of the South and West. The new adjustment should permit all sections of the country to develop the industries for which they have natural advantages. It should contribute to a sounder regional specialization than we have heretofore had.

This decision will neither destroy the economy of the industrial East, nor will it, overnight, assure the industrial flowering of the South and West. It constitutes one sound step toward establishing that equality of opportunity for all sections of the country which is essential to a nation that bears the proud title of The *United* States.



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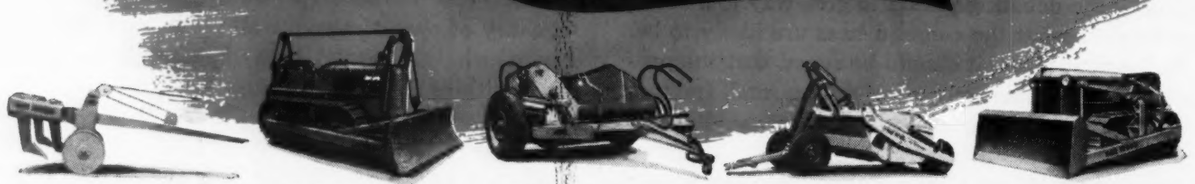

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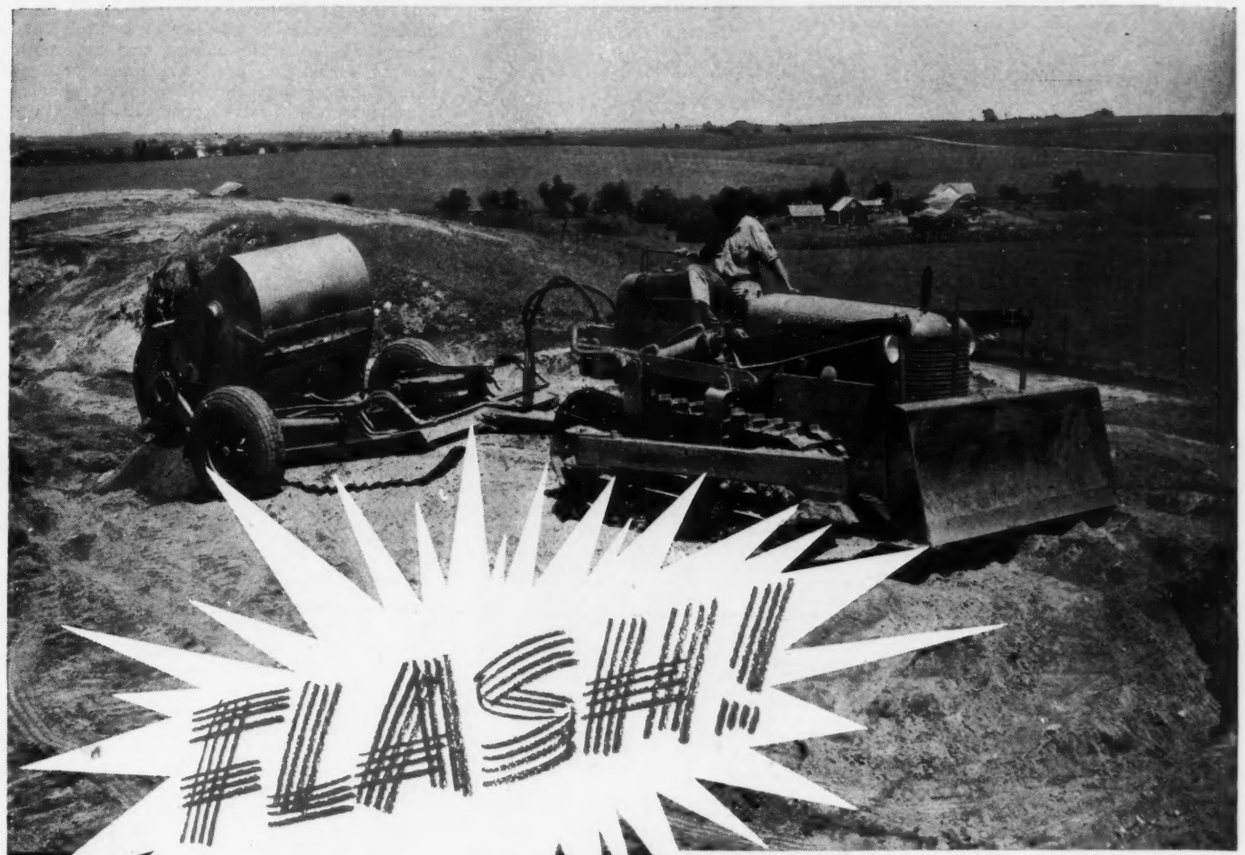

With 60 drawbar h. p., the HD-7 gives you ample power to handle suitable 2- or 4-wheel scrapers, pusher loading, bulldozing and the pulling of graders, sheep-foot rollers, other equipment. Fast working speeds to hurry the job — up to 6.27 m. p. h. Electric starting and operation on Diesel fuel! 200-hour truck wheel and front idler lubrication!

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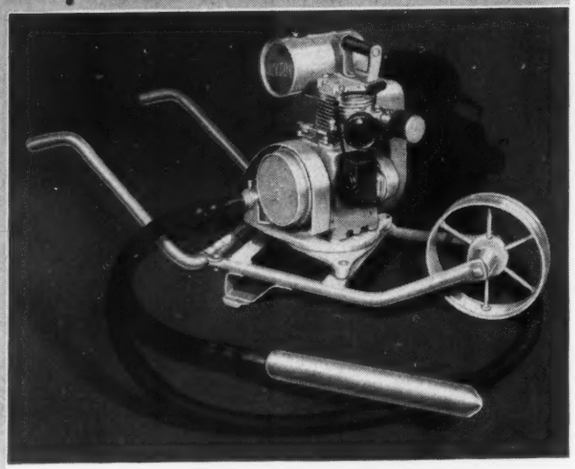
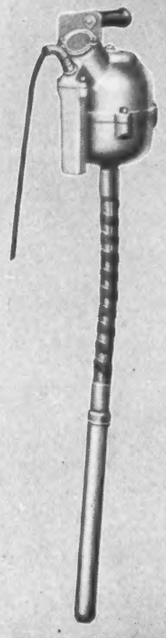
A very dependable independent unit, gas engine powered. Up to 7500 V.P.M. 3 heads for thick and thin sections. Flexible shafting in 7 ft. to 14 ft. lengths up to 28 ft. Automatic clutch, Swivel, dirt-proof base. Wheelbarrow optional.





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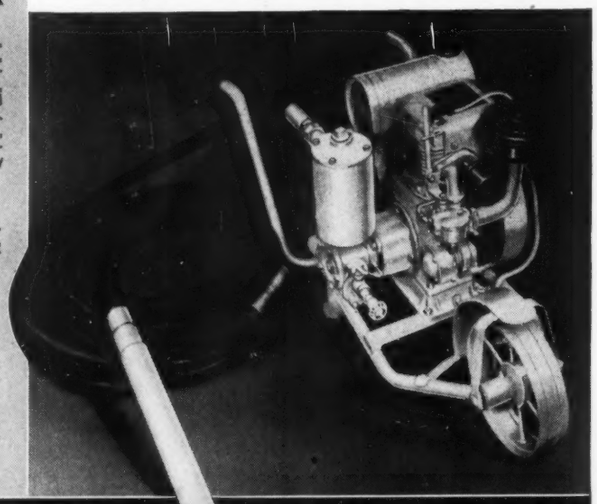
JACKSON FLEXIBLE SHAFT VIBRATOR MODEL FS-4A

Excellent for thin walls, tight, narrow places, and between reinforcing. 110-120 volt AC., DC. 6500 V.P.M. Head 1-13/16" x 17" or 10". Shaft lengths 24", 39", 7 ft. and 14 ft. Lightweight motor, easily held by operator.



JACKSON HYDRAULIC VIBRATOR MODEL HS-A1

A husky, dependable concrete vibrator for general use. Oil-powered, gas engine hydraulic pump drive. 4000 to 7000 V.P.M. Vibrator head 2¾" x 21". Quickly fitted with head for wet or dry rubbing.

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CAPPING OF PILING in construction work on ferry docks, wharves, bulkheads, and drydocks has been made easier for marine and building contractors, eliminating need for tedious and costly manual cutting by use of new guide attachment in connection with Davey pneumatic saw. Consisting of two lengths of pipe or bar stock secured forward and rearward beneath the unit, this device

acts as a guide runner on the battens and insures a uniform, level cut within tolerances of battens. This appliance may be made by contractor to suit specific needs with instructions furnished by Davey Compressor Co. Because it eliminates practice of shimming, and thus promotes sturdier construction, this method is specially applicable to problems where piling must be cut accurately to take beams. Compact tubular design permits Davey saw to work between piling spaced as close as 21 in., and allows one-man operation where unusually tight quarters prevail. Compressed-air operated rather than electrically operated, with built-in oiler, it works efficiently under water. Also standard cross-cut blade makes sharpening easy and requires only 30 sec. for replacement.—**Davey Compressor Co., Kent, Ohio.**

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PORTABLE DESK for use of shipping clerks, inspectors and dispatchers, stands on 3-in. swivel casters and has a positive brake attachment. Overall size, 34½ in. wide, 30 in. deep and 53 in. high (43 in. high in front). Desk hood provides space for storage of papers and has 30-in. desk

top with a 3-in. overall slope. Drawer 24x28x3½ in. in size, is equipped with a lock for safekeeping of important papers. Other models available: counter-type model (no legs); cabinet desk; desk high type; stationary type and a model which fastens to the wall.—**Lyon Metal Products, Inc., 69 Clark St., Aurora, Ill.**

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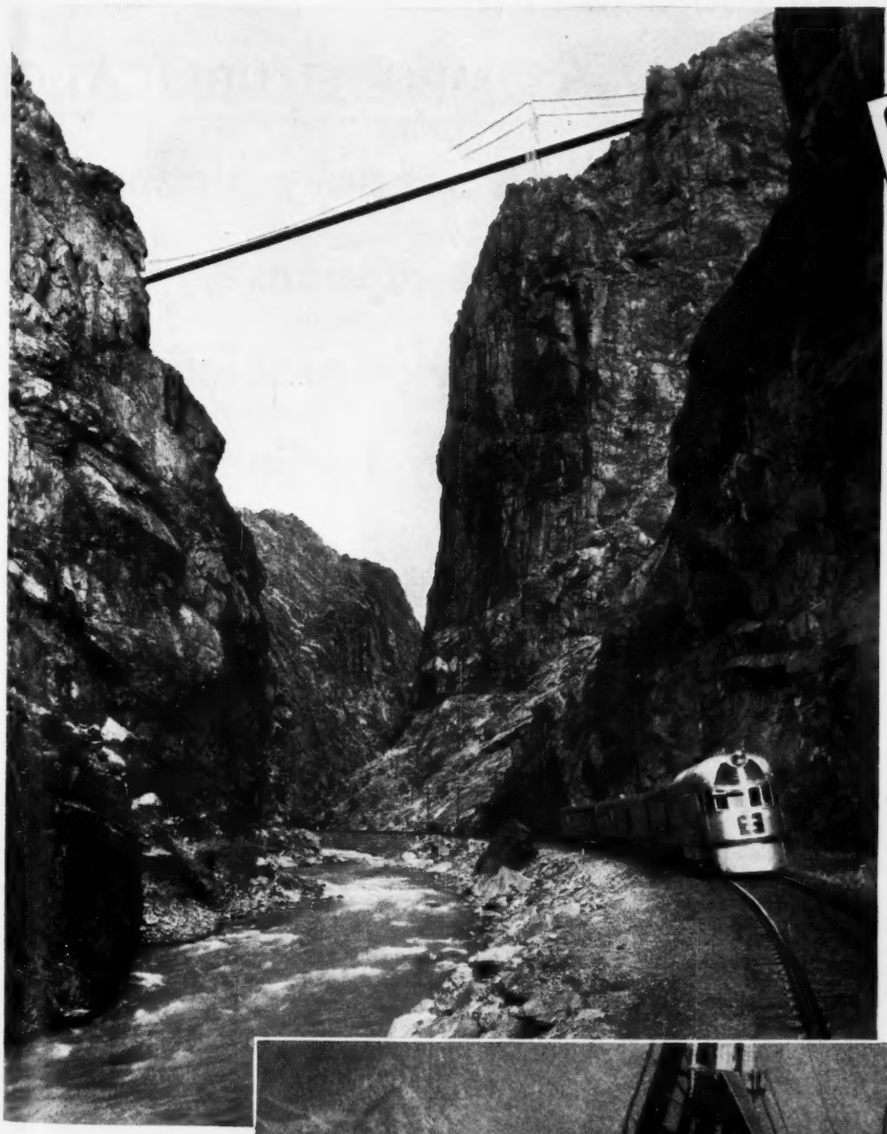
Rebuilding the roadbeds of the nation's railroads after the war years' forced neglect will require millions of tons of aggregate. Much of this work must be done in remote sections of the country so that it will be more advantageous to take the crushing plants to the jobs. That's why the portability and high capacity of Cedarapids Master Tandems are so important. With a Cedarapids Primary unit ahead of it, the Master Tandem reduces big rock to uniform ballast size in a continuous flow, smoothly and economically. The entire plant is on wheels and can be moved easily from one job to the next without delay. Every part is designed and built to stand up under the hardest use with only a minimum of maintenance.

Whatever your requirements for aggregate producing or asphalt mixing equipment for tomorrow's construction jobs you'll find your best source of supply in Iowa's complete line. See your local dealer or write.



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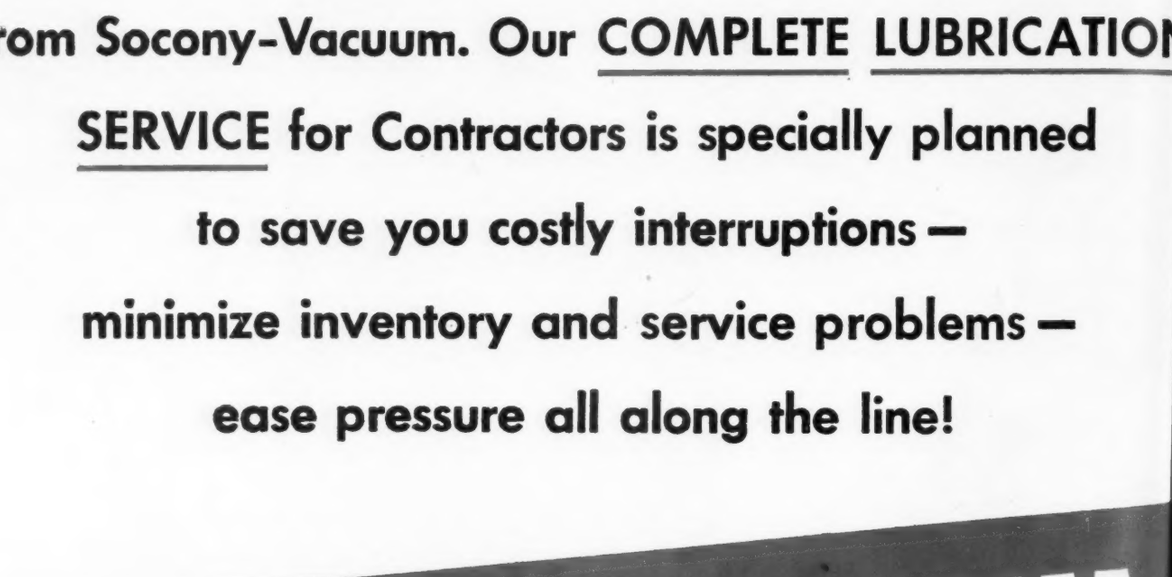
You get far more than oils and greases from Socony-Vacuum. Our COMPLETE LUBRICATION SERVICE for Contractors is specially planned to save you costly interruptions — minimize inventory and service problems — ease pressure all along the line!



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Our complete line of quality lubricants assures maximum protection for every machine—*exactly* the right oil or grease no matter how unusual the application! Result: fewer breakdowns—more continuous machine operation.

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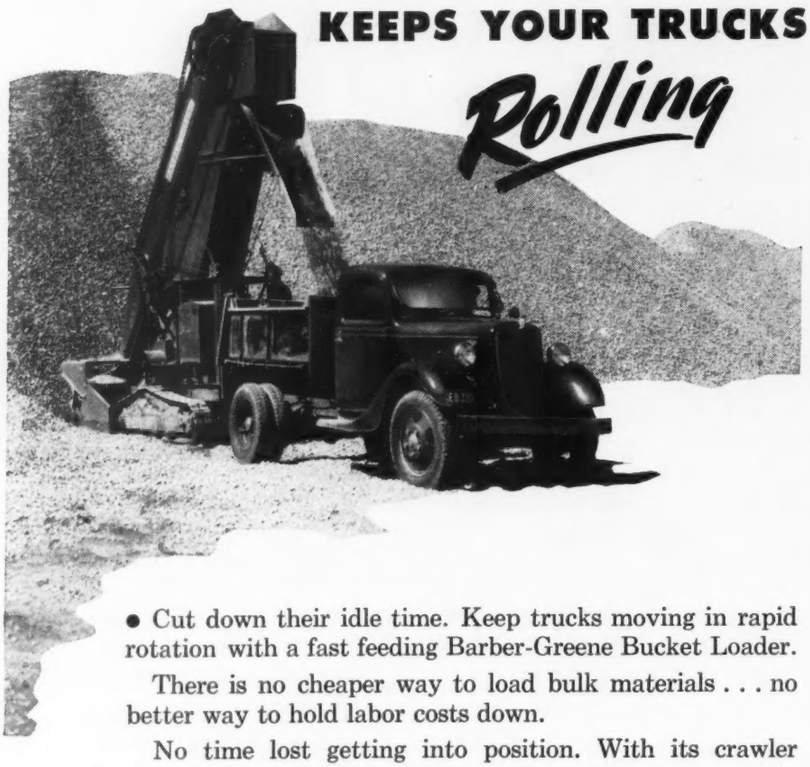

• Cut down their idle time. Keep trucks moving in rapid rotation with a fast feeding Barber-Greene Bucket Loader.

There is no cheaper way to load bulk materials . . . no better way to hold labor costs down.

No time lost getting into position. With its crawler mounting, you can get over soft spots, maneuver in cramped corners easily.

Cutting action across the full width of the feeding spirals keeps the buckets full. Material is delivered at top capacity from stockpiles, natural deposits, and during light excavating, stripping, or shoulder shaping. You have twelve crowding speeds to cope with any loading condition.

There are a score of other advanced mechanical features in the B-G Bucket Loader that will help you save money on every material handling job. Write for free literature. Barber-Greene Company, Aurora, Illinois.

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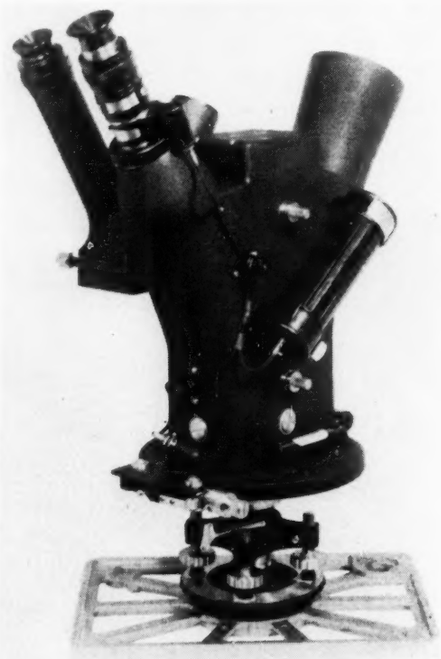
PENDULUM ASTROLABE, invented by John E. Willis of David White Co., provides an accurate, economical, portable and convenient means of determining longitudes and latitudes by use of star observations, radio time signals and a local timekeeper. Attainable instrumental accuracy, 0.1 second of arc, or better (less than 10 ft. of longitude or latitude). A self-correcting instrument, it may be



adjusted so that each division of the rough level vials used may correspond to as small a change of instrumental altitude as may be desired. Is claimed to be of especial interest to engineers (1) for identification of locations selected in prospecting or in other work, with or without mapping; (2) for establishing control points for aerial and general surveys; (3) for establishing control points for treatment of deflections of the vertical in geodetic surveying; (4) for determining time; (5) for teaching practical astronomy.—**David White Co., 315 W. Court St., Milwaukee 12, Wis.**

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Actual tests on the rock.

The testing machine.

CLEVELAND ROCK DRILLS are PRE-TESTED to insure PEAK PERFORMANCE!

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As the first step, every machine undergoes a 4-hour break-in period. Then it is pulled down, carefully examined and re-oiled. Secondly, at regular intervals, machines are taken from the run-in line and are operated in actually drilling rock.

Then, every unit is placed on our testing machine. This machine hydraulically transmits the drill's blows to a diaphragm which in turn registers on a moving tape. Card records of each test are kept, showing (1) The number of blows struck per minute, (2) force of blow in foot-pounds and (3) the rate of air consumption of each drill.

This careful pre-testing, along with their modern design and skillful manufacture, explain why Cleveland Drills perform so well on the job.

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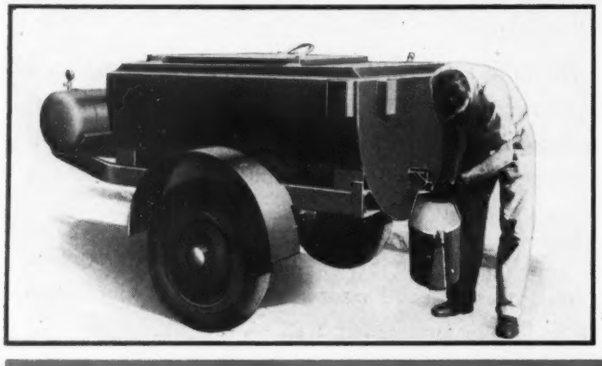
GET IN THOSE LAST LICKS BEFORE WINTER

1. WEATHER-PROOF

Weather-proofing is the cheapest insurance in protecting your original investment in your roads. On newly constructed pavement do not put the weather-proof coat on until the mix has properly cured. In average cases .10 of a gallon to .33 of a gallon of asphalt per square yard is applied to 10 to 30 lbs. of material. This type of surface is also used to reliven old asphalt pavements and to seal them against the ravages of winter. For actual prescribed amounts and types of material for you to use, contact the Asphalt Institute, 801 Second Avenue, New York City, New York.

2. PATCH . . .

The longer a chuck-hole, pot-hole or a raveled edge remains, the larger it becomes and the more danger it is to your base if not repaired before fall rains and winter snows. Clean out the hole at once. Square it up in the direction of traffic so as to provide a shoulder against the movement of the patch. Then fill this hole with new aggregate, the same character as is adjacent to the surrounding area. Then thoroughly consolidate the material in place. Pictured at the right is a Standard Steel Works Model SJ being used to prime a cleared patch.



3. FILL CRACKS

Cracks and crevices in pavements give water an open access into the base of your road which will result in deterioration of the base and final breaking of the surface. Cracks should be watched carefully and filled at once. In filling cracks, a mineral-filled asphalt should be used and poured hot into these cracks. Material should be heated to a temperature not to exceed 375° fahrenheit. Shown at the left is a Model S Tar Kettle and the operator is drawing off material into a crack filling pot. The joint should then be filled flush with the pavement and any excess material be removed.

Standard Steel Works
NORTH KANSAS CITY, MO., U.S.A.

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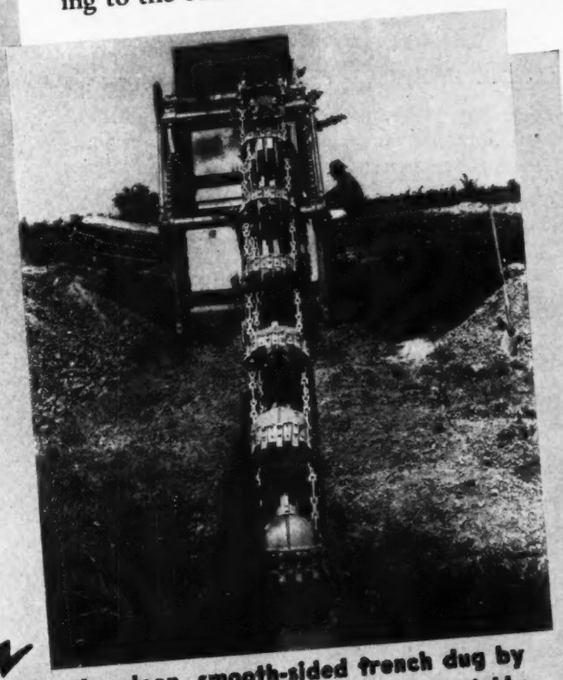
Be Ready for "C" Day with Buckeye Trenchers!

"C" Day is the day when competitive bids will be let once more on trenching jobs and other construction work. Contractors who successfully bid and complete jobs according to the contract will do so because they have *the right equipment* with which to do the job. Buckeye Trenchers are *the right equipment* for trenching jobs, because they are built to stay on the job day in and day out, digging maximum yardages at the lowest cost. You take no chance in buying Buckeye Trenchers for today's work as well as for close bid postwar business. They have proved their capabilities by setting cost-cutting records on all sizes of trench construction from giant intercepting sewer trenches up to 12′ wide and 24′ deep, down to small municipal service trench.

Prepare for "C" Day now. Send today for catalogs on Trenchers.



Note the clean, smooth-sided trench dug by the Buckeye 120. Digging boom can be quickly and easily shifted from one side to the other for passing obstructions. Cuts trench 16" to 48" wide and up to 11'6" deep (60" width and 15' depth with optional equipment).

Buckeye model 410 at work on an Ohio sewer project. The 410 is ideal for use in the close confines encountered in city work. Digs trench 18" to 24" wide and up to 6' deep (7'6" depth optional).

Built by Buckeye

Buckeye Traction Ditcher Co., Findlay, Ohio

Convertible Shovels

Trenchers

Tractor Equipment

Road Wideners

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Spreaders

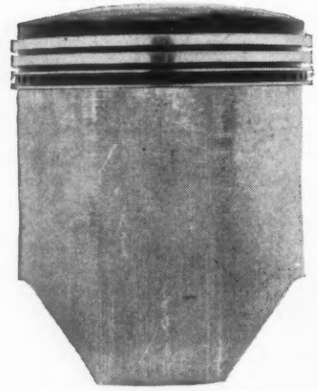
What is an HD oil?

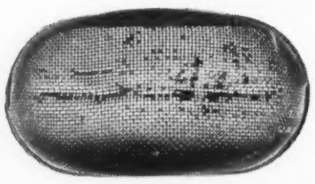
AN HD, or heavy duty, oil is considered to be an oil that passes U. S. Army specification 2-104 B requirements—or an oil having both detergency and high resistance to oxidation.

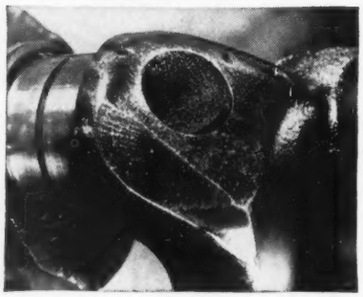
Army specification 2-104 B requires not one but a number of engine laboratory tests—originally developed by various gasoline engine and Diesel manufacturers for determining the performance of oil in their engines. An oil must meet all requirements in these tests to be acceptable.

Stanolube HD was one of the first oils to meet the Army specification. That means it is a top quality motor oil for all Diesel and gasoline engine lubrication. It has been available since 1942 but not for civilian use except in essential fleet operation.

Already many miles of low-cost truck fleet records have been made because of Stanolube HD's clean maintenance-reducing operation. If your fleet is troubled by varnish deposits, hot engine sludge, bearing corrosion, or unusually dirty engine operation under heavy duty service, get Stanolube HD. A Standard Oil Automotive Engineer can help you put this maintenance-saving motor oil to work in your fleet. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Automotive Engineer nearest you.







TYPICAL COMPARISON OF ENGINE PARTS AFTER HEAVY DUTY SERVICE TESTS

The Piston at the left is free from varnish and oil rings are clean with Stanolube HD on the same test which left the piston at right badly coated with varnish.

The Oil Screen at left is free from any deposits when operating on Stanolube HD but became practically clogged on conventional motor oil.

Crankshaft deposits in the picture at left are entirely absent while the crankshaft at right was heavily coated with sludge when conventional oils were used in the test.

Buy more War Bonds

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ FLEET CONSERVATION SERVICE

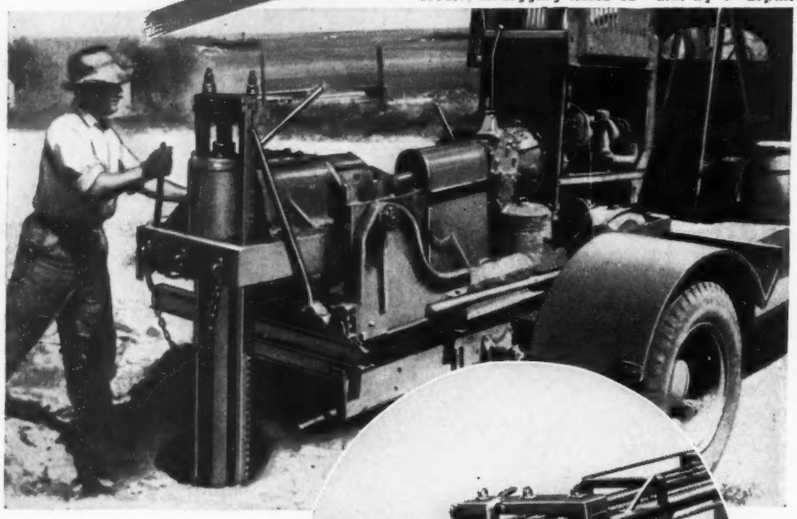
GOOD EQUIPMENT MEANS SUCCESS

The Page Walking Dragline and the Page Automatic Bucket pave the road for a successful coal-stripping operation. Why do you think contractors and coal strippers insist on Page equipment?

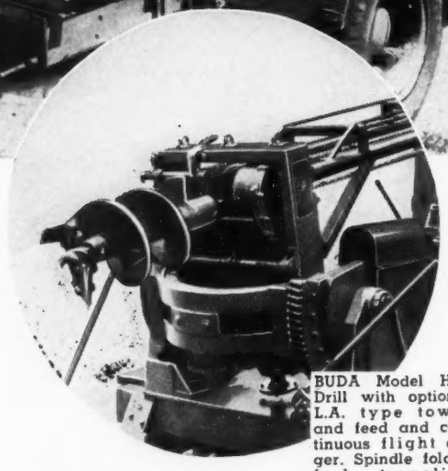
PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

HOLES ...in a hurry

BUDA Model HBE truck mounting type drill with chain and tube feed. For digging holes 12" dia. by 6' depth.



with the BUDA earth drill...



BUDA Model HBE Drill with optional L.A. type tower and feed and continuous flight auger. Spindle folded for low traveling height. Drills 8" to 42" dia. to 10' depth. 12" to 30" dia. to 24' depth.

A BUDA Earth Drill will speed up your hole digging jobs and save you many dollars. It's especially designed for fast, clean drilling on pole line work, foundation and bridge jobs, guard rail installations, preboring for piles, etc. Sturdily built for long and dependable service. All drive gears enclosed and run in oil bath.

Self-contained models furnished to drill large and small diameter holes to a 24' depth, also deep hole or testing drills for digging small diameter holes to 100'. Write for details.

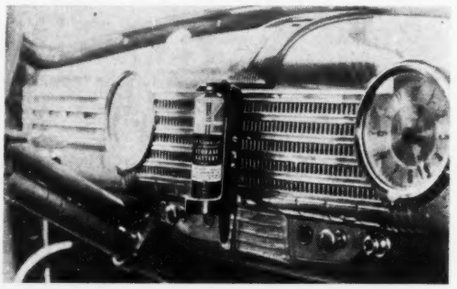
BUDA Model 2215-SB "All-Purpose" Automatic Lowering Jack. 15 ton capacity.

BUDA Model No. 5010 Ball Bearing Mechanical Jack. 50 ton capacity.

BUDA

15425 Commercial Ave. Harvey (Chicago Suburb) Illinois

SINGLE UNIT CHARGER for rechargeable wet flashlight storage battery operates from ignition system of automobiles, trucks, buses, tractors, boats and airplanes, assuring top charge at all times. Easily attached on dash, cowl, side panel or other convenient place on vehicle and does its work with motor either running or idle. For charging



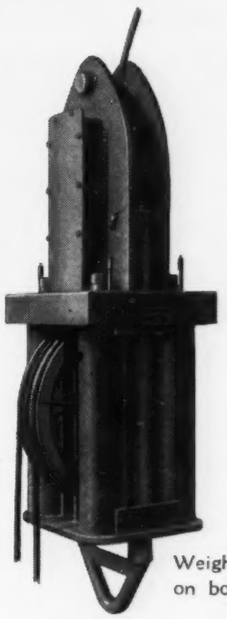
while vehicle is not in use, it is attached to "live" side of ignition system. Operates on 6 and 12 v., dc. When battery is charging, pilot light glows at top and toggle switch at side prevents danger of overcharge while battery is in charger. Charger should be mounted vertically so battery will be upright. Connecting wires are red and black so ignition wires can be correctly tapped. Red is attached to positive side, black to negative side of ignition system. Glossy black plastic case.—**The B. F. Goodrich Co., Akron, Ohio.**

ELIMINATE GUESSWORK

with the

CLYDE CRANE GAGE

(Patent Applied For)



Weighing unit on boom end

The Clyde Crane Gage is a new and scientifically engineered instrument that eliminates all guesswork for your operator while handling loads on any type of crane. No longer will he have to guess at the crane's capacity, at the weight of the load or at the radius of the boom.

The Clyde Crane Gage shows not only the load and radius but also flashes a red warning whenever the combination becomes dangerous. If the load is within the rated capacity of the crane; green lights give visual assurance of the margin of allowable safety.

The operator does not have to know the weight of the load nor the radius or read the dials. He can work with absolute safety by watching the color of the lights and keeping in the green safe-zone.

Write for special bulletin giving full information.

Dial in operator's cab

CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

WE'LL BE READY, WILL YOU ?

Are you preparing to meet the keen competition that is predicted once the tremendous post-war construction boom gets underway? It's not a moment too soon to be thinking about the new rig you'll need . . . dependable, economical equipment that will turn in a profit on every job.

We'll be ready to fill your requirements with the most complete line of construction and excavating equipment ever to bear the century-old Osgood name. The same engineered design and precision construction, that have always characterized Osgood equipment, are applied to more than a dozen Osgoods from 3/8 to 2½ yards capacity.

We'll be ready, too, with new and improved Mobilcranes, likewise equipped with every improvement in design and manufacture that wartime work has uncovered. Whatever your post-war needs, you'll find the answer in an Osgood . . . "proved in world-wide service."

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD
CRANES-SHOVELS MARION OHIO U.S.A. OSGOOD GENERAL

THE OSGOOD COMPANY • MARION, OHIO

ARMY E NAVY

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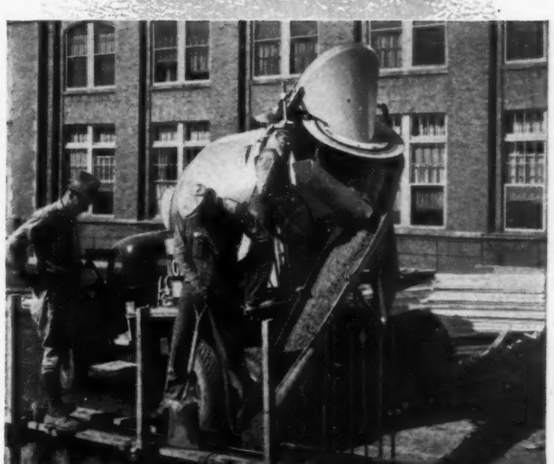
SHOVELS, DRAGLINES
CRANES

Yes Sir- MY SMITH-MOBILE GIVES ME EVERYTHING I WANT!

"Why should I take unnecessary chances with UNTRIED truck mixers, when Smith-Mobile is a TRIED and PROVEN Product?"

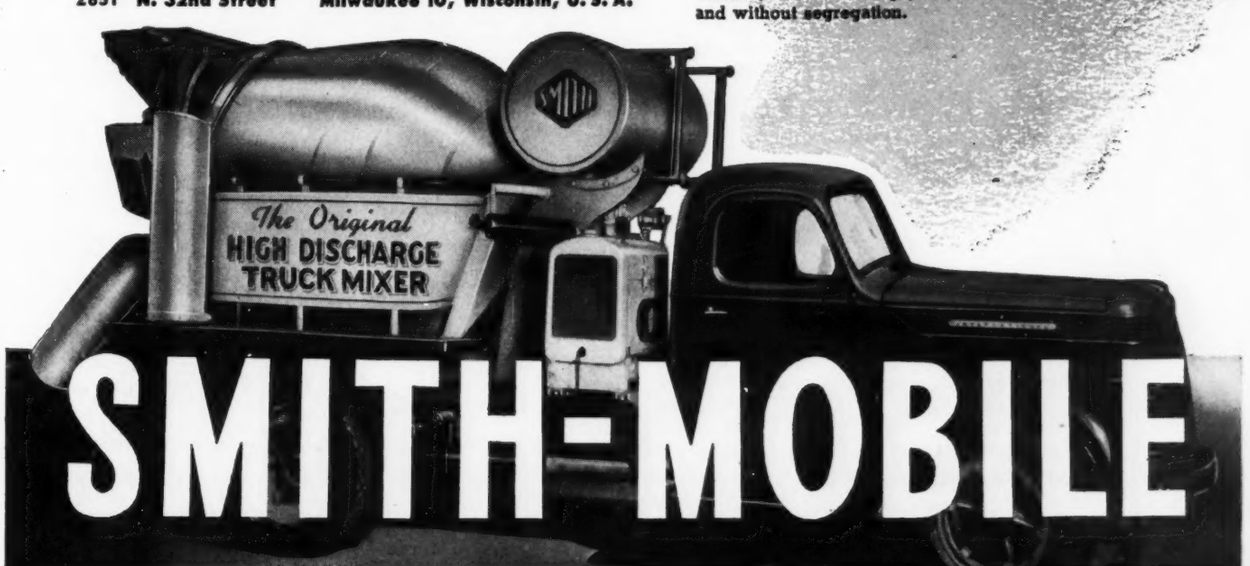
Ready-mixed concrete operators everywhere are playing safe by using dependable, job-tested Smith-Mobile Truck Mixers and Agitators. They KNOW Smith-Mobile fills the bill. They like its many time-saving, cost-reducing features. Backed by almost a half-century of specialized mixer building experience, Smith-Mobile is now entering its 8th year of quantity production. Instead of periodically introducing "new models", Smith has always been committed to a policy of constant improvements and refinements. That's why Smith-Mobile is today the LAST WORD in truck mixer design. Get the facts! Ask for Catalog No. 198-C.

The T. L. SMITH COMPANY
2851 N. 32nd Street Milwaukee 10, Wisconsin, U. S. A.



CONTROLLED DISCHARGE

Just one of Smith-Mobile's many job-tested features. The illustration above shows a Smith-Mobile discharging directly into forms. Operator is getting just what he needs for this particular job — discharge, fast or slow, under perfect control and without segregation.



SMITH-MOBILE

✓ PISTON-TYPE CONTROL VALVE

✓ CENTER-LIFT HOIST

✓ REVERSIBLE TAIL-GATE HARDWARE

✓ EASY-REACH TAIL-GATE LEVER

✓ HOIST MOUNTS ABOVE FRAME

✓ ACCESSIBLE HOIST CYLINDER

✓ PATENTED TIRE AND TOOL PACK

✓ DASH CONTROLS FOR HOIST AND TAKE-OFF

Only from Hercules do you get all these advantages for easy, low-cost, efficient operation and maintenance. For example—consider the fingertip controls which operate Hercules hoists and power take-offs. Pull out two buttons . . . up goes the body and the load is dumped. Push the same two buttons . . . the body slips down into road position. Simple, isn't it? And it's only one of a host of reasons why you'll want Hercules dump bodies for your postwar trucks.

Until you can get the new Hercules dump body you want, let your Hercules distributors keep your present equipment in running order. He will furnish the service you need.

TURN-O-MATIC CEMENT BOXES

NOW AVAILABLE

Deliver cement at the right time, in perfect condition and without splash or dust, with Hercules Turn-O-Matic Cement Boxes. Immediate delivery. Write today.

HERCULES

DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

HERCULES STEEL PRODUCTS COMPANY . . . GALION, OHIO

SELF-PROPELLED, ONE-MAN-OPERATED CRANE, of particular interest to those in the material-handling industry, is powered by a single engine, either gasoline or diesel, and is equipped with an all-purpose, jib extension boom for multiple yard operations. Rated lifting capacity is 5 to 7

tons from the 30-ft. straight lattice boom, and the 8-ft. jib extension will handle 4,000 lb. Jib is designed for close-in operations where ordinary angular straight boom lifting would be prohibitive. Cab was designed without sacrifice of weight, capacity or headroom.—**Unit Crane & Shovel Corp., Milwaukee 14, Wis.**

Shunk

Superior Quality

BLADES AND CUTTING EDGES

For any make of machine Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

50 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

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Member of A.E.D.

MANUFACTURING COMPANY

Established 1854

BUCYRUS, OHIO,

Ready for Any Job

AT ANY TIME

There's no end to the list of practical jobs that you can do with a 2000-watt Homelite Portable Gasoline-Engine-Driven Generator. Many contractors move material faster by connecting an electric drill (run by a Homelite) to the drum of an ordinary hand driven hoist and have a power hoist.

Homelite Portable Gasoline-Engine-Driven Generators are "ready for any job at any time" because they are dependable at all times... ready to start and sure to run without trouble, no matter where you put them or what the working or weather conditions are.

Homelite Corporation

Portable **PUMPS · GENERATORS · BLOWERS**

PORT CHESTER, NEW YORK

Available Now

Here's good news. Now that the war is confined to one front and armed services requirements have slacked off a little, a limited number of Insley Excavators are available to civilian buyers upon authorization of WPB. The first Insley released to a civilian contractor since 1942 already has been delivered and more will follow.

For lower cost yardage on your job, see your Insley dealer today about the availability of a new 3/8 or 1/2-yd. Insley Excavator. Designed for use with five readily interchangeable attachments . . . shovel, crane, hoe, clamshell and dragline . . . crawler, rubber or rail mounted . . . gasoline, diesel or electric powered.

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

FOUR NEW FACE SHIELDS which provide light-duty protection on operations such as metal sawing, acid handling, buffing, sanding and light grinding are light, comfortable and sturdily made to withstand hard use. Designed to be worn without discomfort by workers who wear prescription glasses. All parts easily interchangeable, facilitating handling, stocking and assembling. Three types of button-on windows for shields are provided, clear cellulose acetate for general purposes, 24-mesh screen for heat protection and fiber with filter glass window for welding and scarfing. Leather sweatbands button on and are easily

removed. Fiber headpiece holds device firmly on head. Shield may be thrown up instantly when not in use and held securely in position by friction joints. Removal of pivotal nut, spider and washer permits instant interchanging of parts. One type is fitted with standard spark deflector for extra protection. Another model has a fiber back headband which slides within a fiber sleeve, permitting easy adjustment to varying head sizes. A third type has a full spark or head deflector designed for working in confined places where head bumps and lacerations might occur. This semi-skullguard protects forehead and upper scalp from flying chips, small cuts and bumps.—**American Optical Co., Southbridge, Mass.**

★ ★ ★

PNEUMATIC BABY SAW for ripping steel, brass, aluminum and like metal sheets up to 3/16 in. thick cuts at rate of 1 in. per sec. on a straight line or curved leaving edges free from burrs.

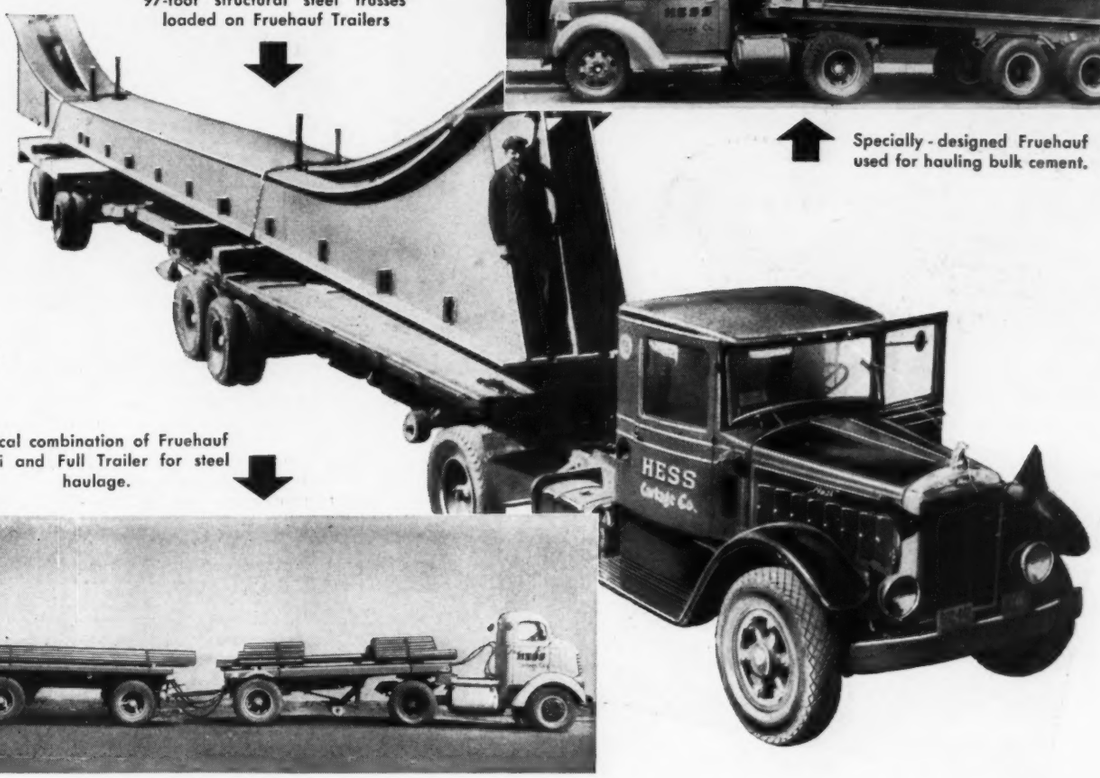
Equipped with a saw of special steel especially heat-treated for the type of work to be done. Weighs 2¾ lb. and is about 8 in. long.—**The Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland 5, Ohio.**

"FRUEHAUFS- OUR CHOICE FOR HEAVY HAULING"

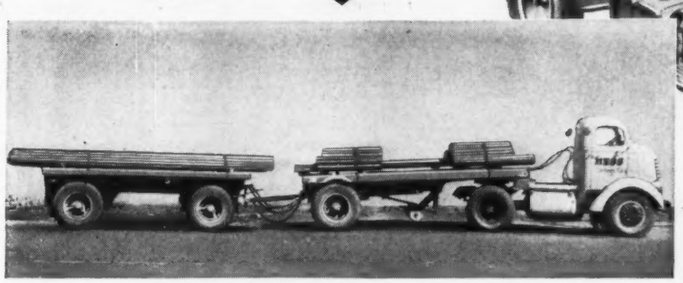
—SAYS HESS CARTAGE COMPANY

Specially-designed Fruehauf used for hauling bulk cement.

97-foot structural steel trusses loaded on Fruehauf Trailers



Typical combination of Fruehauf Semi and Full Trailer for steel haulage.



Hess Cartage Co., Detroit, makes a specialty of heavy-duty hauling for contractors and suppliers — and uses a fleet of 160 Trailers for this important work.

The company purchased its first Fruehauf back in 1920. This veteran Trailer withstood 17 years heavy usage before it was retired. Later units have been in service for 20 years—and are still in daily operation.

According to Edward Hess, president and general manager, the company was the first to transport steel on a Semi-Trailer. In the years since, during Detroit's phenomenal industrial growth, they have used Fruehaufs to carry structural steel for nearly all of the city's skyscrapers and a majority of the automobile factories in the area.

One of the most interesting hauls they have handled was the transportation of huge 97-foot structural steel roof trusses from Detroit to East Lansing, Michigan, for the erection of Michigan State College. Twenty-two trips were made with these 36-ton loads, using a hook-up of a 24-foot Semi-Trailer, a "dolly" and a 40-foot Pole Trailer.

A big part of Hess Cartage volume, also, is the haulage of bulk cement, for which they employ a fleet of 30 specially-designed Fruehauf Trailers. Typical of their work in this field was the job of supplying cement for the runways of the Army Air Base at Oscoda, Michigan. Running 80 miles from Bay City and 50 miles from Alpena, the Fruehaufs in the Hess fleet carried 130,000 barrels of cement in 41 days!

Edward Hess' statement: "Fruehaufs — our choice for heavy hauling", is based on 25 years' experience.

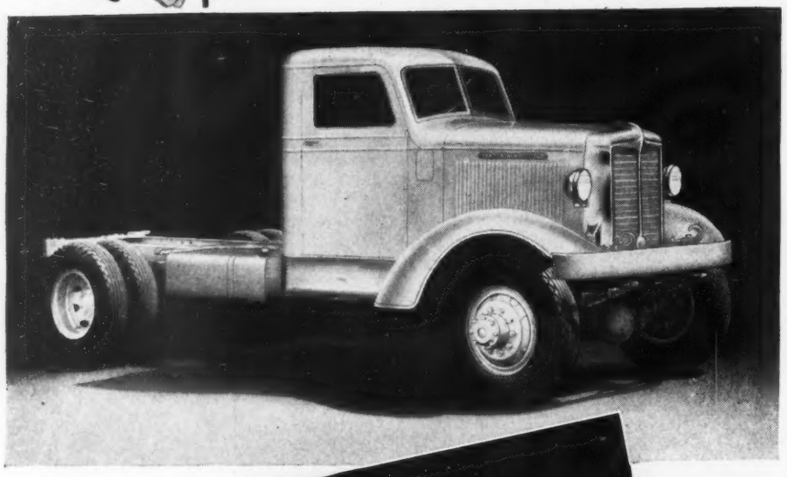
World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY, DETROIT 32

Service in Principal Cities

FRUEHAUF TRAILERS — FRUEHAUF TRAILERS — *"Engineered Transportation"* REG. U. S. PAT. OFF.

Back in "Civvies" Again



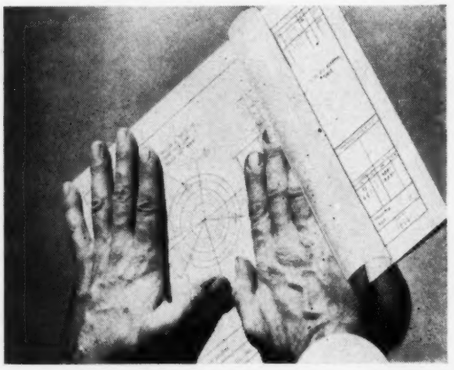
2 NEW HEAVY DUTY *All-Wheel-Drives!*

All the tried and approved Marmon-Herrington engineering features! Greater approach angle, low center of gravity and wide range of gear ratios, plus still greater ease of steering, more positive braking and many refinements in mechanical details. . . . For operation in construction, road building and road maintenance services they have no equals. For snow-removal they top all previous records. For the gruelling cross-country jobs of the oil fields and logging "shows" they are unbeatable. . . . Ask for literature describing these Heavy Duty *All-Wheel-Drive* models and Marmon-Herrington *All-Wheel-Drive* converted Fords—the fastest, most maneuverable and most economical *All-Wheel-Drives* on the market.

MARMON-HERRINGTON CO., INC. • INDIANAPOLIS 7, IND.
Cable Address: MARTON

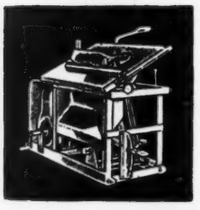
MARMON-HERRINGTON
All-Wheel-Drive TRUCKS

TRANSPARENT ADHESIVE SHEET, named "Dulseal," is a tissue-thin cellulose acetate sheet with a mat surface which has a multitude of uses in drafting rooms, engineering departments and general offices because of its efficiency in protecting, preserving and repairing tracings, drawings, black and white prints, blue prints, maps, records, charts and sketches. Since it takes printer's ink well, it can be used for making title block for



attachment to drawings and prints. May be written on with pencil or ink and erased in the regular way or by rubbing with a moist cloth. Applied by hand pressure, slow-acting adhesion makes Dulseal easy to use. Forms a permanent protective covering that is waterproof, dustproof, greaseproof and washable. Adhesive used on sheet will stick to practically any surface—**Charles Bruning Company, Inc., 4700 Montrose Ave., Chicago 41, Ill.**

C.H.&E.

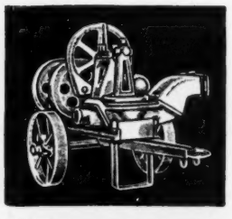


SAW RIGS

4 sizes—ripping capacity 2" to 6" lumber — gasoline engine or motor drive.

PUMPS

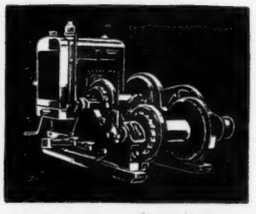
Diaphragm, Self-Priming Centrifugal Piston Triplex & Jetting Pumps



Also 3-Ton Road Roller

HOISTS

5 sizes — from 800# to 7000# lifting capacity — gasoline engine or motor drive.



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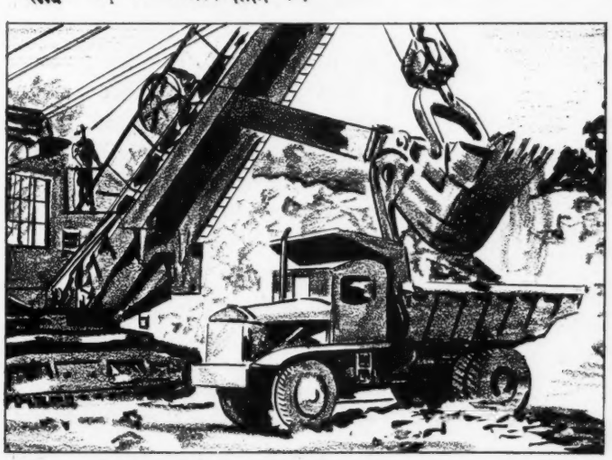
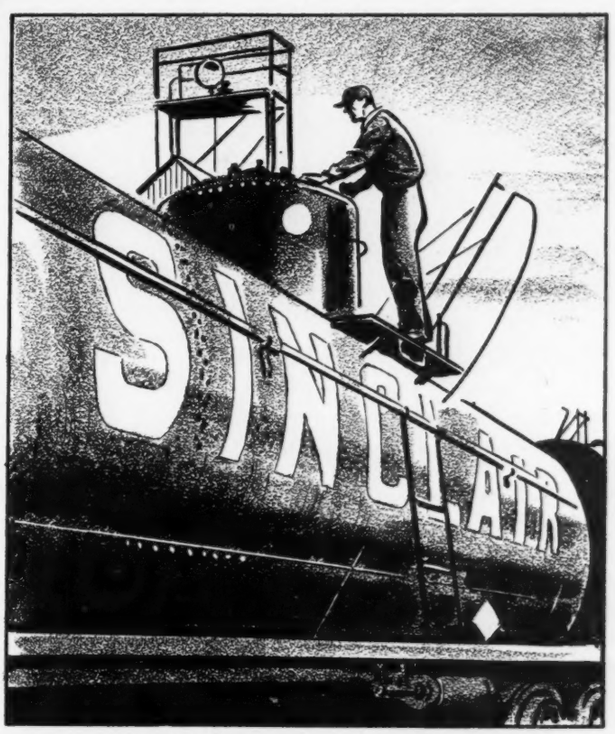
C. H. & E. Manufacturing Co.
3847 No. Palmer St. Milwaukee 12, Wis.

Do you know that-

SINCLAIR'S GREAT CRUDE OIL AND PRODUCTS PIPE LINE SYSTEM IS MORE THAN 14,000 MILES LONG... A LENGTH SUFFICIENT TO STRETCH FROM SAN FRANCISO TO MANILA AND RETURN. THIS SYSTEM PLAYS AN IMPORTANT PART IN SOLVING THE PETROLEUM INDUSTRY'S DISTRIBUTION PROBLEMS.



PROTECTION AGAINST EXCESSIVE WEAR AND SHOP LAY-UP IS PROVIDED BY SINCLAIR SPECIALIZED MOTOR OILS AND GREASES. TEN-OL, A NEW OIL FOR BETTER DIESEL LUBRICATION, FULLY MEETS U. S. ARMY SPECIFICATION 2-104 B.



SINCLAIR OWNS AND OPERATES MORE TANK CARS THAN ANY OTHER OIL COMPANY IN THE UNITED STATES. THEY TRAVEL MORE THAN 325,000,000 MILES ANNUALLY TRANSPORTING PETROLEUM PRODUCTS.

SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

SISALKRAFT Catches the Drip and Debris... Protects As It Cures

SISALKRAFT saves days of man hours in curing concrete, does away with time and labor of hoisting, spreading, and subsequently removing sand. It also eliminates the human element and constant attention of wetting down.

Sisalkraft needs no watching, or sprinkling. Once in place, curing is uniform and automatic . . . gives a hard, dense slab, comparable to immersion curing.

When the cure is complete the Sisalkraft is easily and quickly removed. Because Sisalkraft protects the slab as it cures, there is no cost for grinding or scraping.

Sisalkraft is recognized by top ranking construction engineers as the ideal concrete curing agent. Use it on your next construction job—realize its savings in time and labor.

War production has restricted immediate availability — but after the war, as before, the Sisalkraft dealer organization will be ready to serve you in 48 states.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY
In Canada: Acme-Alexander Murray & Co., Limited, at Montreal, Toronto, Halifax, Saint John, Winnipeg, Vancouver

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

COMPOUNDED OIL AND RUST PREVENTIVE which emulsifies quickly with water or any anti-freeze is not a solvent but will keep radiators, water jackets and cooling systems clean and will prevent rust and corrosion, according to its manufacturers. Gibralter Rad-Treat will also lubricate packing glands in pumps at the same time preventing shrinking and glazing of packing. When caustic solutions are used to flush out a radiator, it is recommended that Rad-Treat be added afterwards to neutralize any acid condition produced by the caustic. To avoid clogged and dirty cooling systems it is recommended that Rad-Treat be used in a proportion of 8 oz. to each radiator in car or truck, or approximately 8 oz. to each 5 gal. of water or anti-freeze. It will keep emulsified and will not settle out.—**The Hood Refining Co., 157 N. Hamilton Ave., Greensburg, Pa.**

★ ★ ★

SYNTHETIC RUBBER RESIN is a new compounding ingredient used for imparting rigidity to synthetic rubber making it useful for wire and cable insulation, for manufacture of safety helmets and like products where an extremely rigid, lightweight, impact-resistant product is desired. Replacing carbon black, heretofore used in synthetic rubber compounding, new resin permits production of synthetic rubber products where colors are desired, as in household and decorative items, toys and kitchen equipment and where a high resistance to electrical currents is required. —**Goodyear Tire & Rubber Co., Akron, Ohio.**

You Can Help

● Paper is a Number 1 war material shortage — because over 700,000 different war items are wrapped, packaged, labelled, tagged, or made from paper or container board. The Pacific war, when it speeds up, will require stupendous amounts of paper and board since double and triple packing are required for protection against weather, insects, etc.

So please—

1. Share this magazine with your associates. Because of the paper shortage, the number of copies is limited.

2. Organize for a continuous drive in your office and plant to collect waste paper of any kind to put into paper salvage. Clean out old files, dead correspondence, obsolete records, useless display materials, cartons.

Aid the war effort—speed victory
DO THIS EXTRA BIT TO HELP.

FROM HAND-BAGGAGE SIZE . . . ON UP!

GORMAN-RUPP PUMPS WILL FIT YOUR JOB

You may want a pump as small and easy to carry as a bag of tools – Gorman-Rupp has such a pump that will deliver as much as 3,000 gallons per hour. Or, you may have a heavy de-watering job that calls for as much as 125,000 gallons per hour at continuous operation. Whatever the size or application – get one of those dependable, Gorman-Rupp BLUE pumps!

If you want a self-priming, centrifugal pump that never has to be shut down to be cleaned out get a dependable Gorman-Rupp BLUE pump, which has no recirculation orifice to get plugged or control valve to get jammed.

For size, for weight, for power, for cost – Gorman-Rupp self-priming centrifugal pumps can't be matched! Our nearest distributor will send you one and let you be the judge. If it doesn't do a better pump job than any other you have seen, return it at our expense – and it won't cost you a cent!

GORMAN-RUPP PUMPS
ARMY NAVY
UNSURPASSED FOR PUMPING FAST

THE GORMAN-RUPP COMPANY

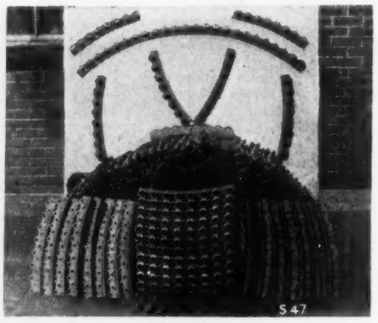
M A N S F I E L D • O H I O

"The Toughest Steel Known"— for Construction Equipment Wearing Parts

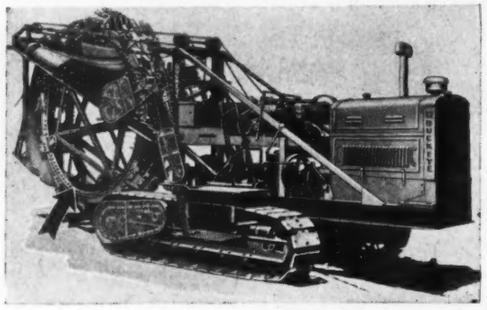
Leading manufacturers of trenchers, power shovels, loaders, bulldozers and other construction equipment have found that the use of austenitic manganese steel enables their machines to stand up in severe service with a minimum of out time for replacements.

Manganese steel parts, such as cutting edges and corner bits, crawler treads, gears, sprockets, sheaves, conveyor chain, dippers, buckets and digging teeth are widely used by manufacturers who value the reputation of their machines for uninterrupted service.

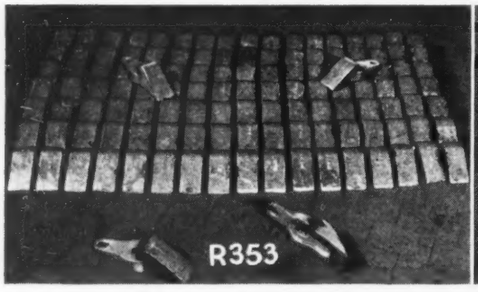
The manganese steel bucket teeth (R-353) and links (R-262)

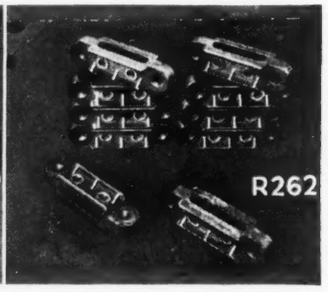


are used on a large Buckeye Trencher employing a digging ladder or boom instead of a digging wheel.



Austenitic manganese steel has "what it takes" for this service. The meshing of gears and pinions always implies friction. Manganese steel work-hardens on the surface to as much as 550 Brinell, so a hard skin is always present to resist abrasive wear.





A case in point is the Buckeye Model 12 Trencher pictured above. The arrow indicates where the manganese steel gear segments shown in Picture S-47 are applied to the rotary digging wheel of the trencher. Placed end to end, they form a circle and there is one complete segmental gear on each side of the digging wheel.

Shocks and other stresses are involved in trencher operation. The inherent body toughness of work-hardened manganese steel withstands these ordinarily destructive forces.

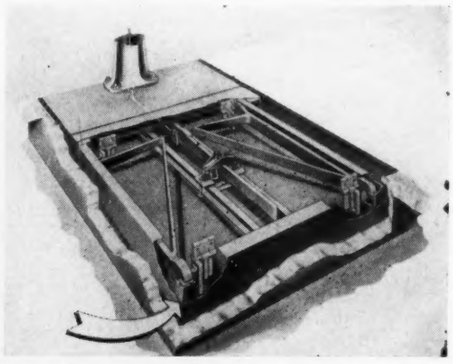
Many manganese steel parts for construction equipment are described in Bulletin 1143-CI.

How Amsco "Conservative Welding Rods" restore worn equipment parts described in Bulletin 941-W

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN **Brake Shoe** COMPANY

PLATFORM SCALES for weighing, counting, batching, testing and measuring, are of both open construction and self-contained types, are built on "free-floating" principle and are designed to



assure correct weight regardless of where load is placed on platform. Equal load distribution, spreading same weight through all four platform corners, permits a hand-lift truck, skid, pallet or any other load to be positioned on any part of platform at no sacrifice in accuracy. This advantage not only cuts weighing cost but also speeds up weighing time. Self-contained dormant platform is shallow enough to fit into floors of wood, metal, composition or concrete which require a minimum of depth. Open construction dormant platform is built on structural steel "H" frame on which entire lever system is mounted. **Yale & Towne Manufacturing Co., Philadelphia 24, Pa.**

How to build or buy a house

located • priced constructed designed to your complete satisfaction . . .

Here is a book which will guide the prospective homeowner in every step of the planning, designing and building of a house. It shows what to do about the financing contracts, liabilities and construction hazards of housebuilding, besides how to get serviceable, comfortable design, and to select the best value in materials and equipment. Contains a buyer's check list for plumbing, wiring, roof, trim, etc., considerations in the selection of an architect and contractor, and pitfalls which can be avoided by careful planning. It is an up-to-date guide to better satisfaction for the intelligent home builder or buyer. Just published.

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"THAT DRUM WEARS A SHOCKPROOF GIRDLE!"

"You can take it from me," said a well known contractor—"Rex has really got something in that shockproof girdle—the Chain Belt Drive that goes completely around the drum of a Rex Moto-Mixer."

Road shocks, strains of sudden stops and starts with a loaded drum are cushioned by the flexible Chain Belt Drive . . . are not passed on to transmission, power plant and other vital working parts. This feature also assures lower maintenance, fewer repairs and far longer truck life.

But the Chain Belt Drive isn't the only outstanding feature. For example, there's the new exclusive mixing action that enables Rex Moto-Mixers to mix low slump concrete . . . *fast!* The new easy-to-replace mixing blades that are *bolted* to the drum. The patented method of water entry that introduces water behind the blades, right where the actual mixing action takes place. The special Rex water system that allows water to be drawn off in any desired quantity—on all sizes of mixers.

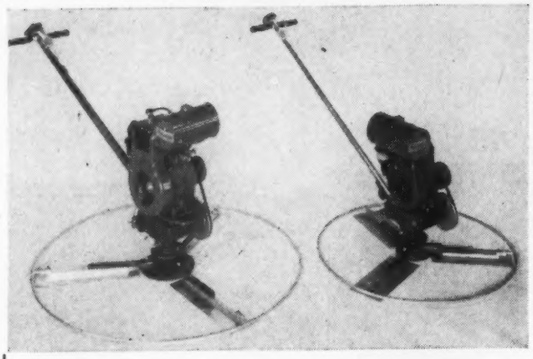
Rex Hi-Discharge Moto-Mixers have been consistently improved, but the basic design has remained unchanged because it was *right*—from the start!

For complete information about the Chain Belt Drive and other outstanding features, see your Rex distributor or send for your copy of Bulletin 405. Write Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS



CEMENT FINISHING by the MODERN LABOR-SAVING METHOD

Whiteman Dual-Purpose floating-finishing machines are now available in 2 sizes. Model "B", the original 48-inch unit is used by practically every large contractor.

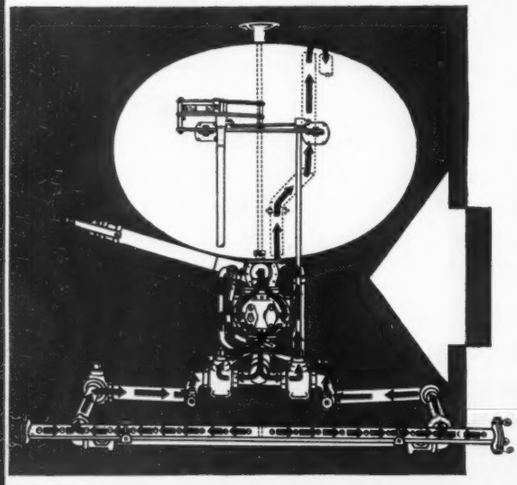
The new lightweight model "J" 36-inch unit, designed for small contractors and industrial maintenance departments, has met widespread acceptance. It is being used satisfactorily by many major industrial plants, such as the largest automobile manufacturer, a well known trans-continental railway, a nationally recognized producer of steel and many other firms.

Write or Wire for nearest distributor

Whiteman MANUFACTURING CO.
3249 Casitas Avenue Los Angeles 26, California

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS

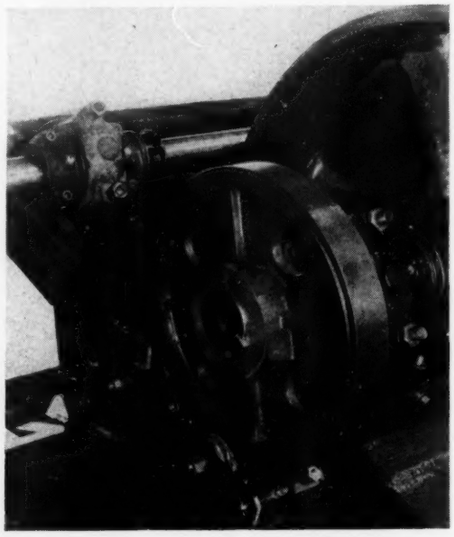
EXCLUSIVE WITH ETNYRE "Vacu-Flo" CLEANING SYSTEM



Just three quarts of flushing oil needed to clean pump, spray bar, valves, strainer and lines! After spraying, all material returns to tank, is not left to clog lines and spray bar. No waste; no need to clean between loads—just at night after last load!

E. D. ETNYRE & CO., Oregon, Illinois

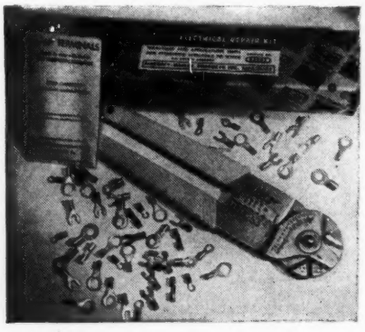
IMPROVED DIFFERENTIAL BAND-TYPE BACK-STOP, available in 12-, 18- and 24-in. dia. drum sizes, is said to be a simple, trouble-free device for preventing belt conveyors or bucket elevators from running backwards if for any reason the power is shut off. Features of these new backstops provide more frictional area, require less tension in the band, remove practically all danger of bending of the shaft, and require a much simpler anchor. Instead of the brake band taking all the torque required to hold the conveyor, the shoe



takes an appreciable part of the load. When the differential acts and the band tightens, the shoe is pulled up against the drum with great force giving added friction (18 percent to 20 percent additional drum circumference is brought in contact through use of the shoe. Less frictional resistance of the brake band itself is required. Internal stress set up in the band and shoe on brake drum on the backward rotation of the drive shaft exerts a squeezing motion causing a braking action by internal forces only. Ordinarily, the braking forces must be taken through, and resisted by, the point of anchorage to the conveyor frame which requires an extremely heavy structural support. In new design, these forces are resisted internally and the only force going through the conveyor frame is that required to prevent a rotation of the brake.—**Barber-Greene Co., Aurora, Ill.**

★ ★ ★

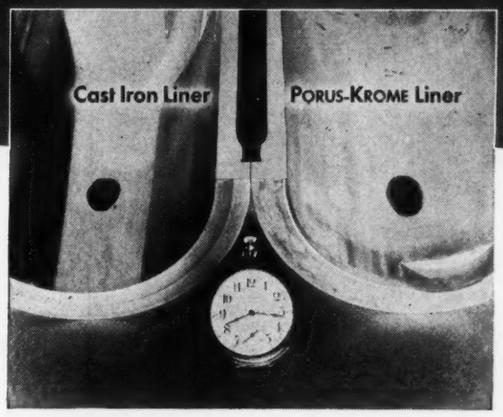
ELECTRICAL REPAIR KIT for solderless wiring comes complete with tool and A-MP terminals for stranded wires sizes 22 to 10. Special A-MP tool supplied with repair kit has insulated handles of molded plastic, is of high quality construction throughout and has a corrosion-resistant finish. Tool allows for cutting wire to any desired length,

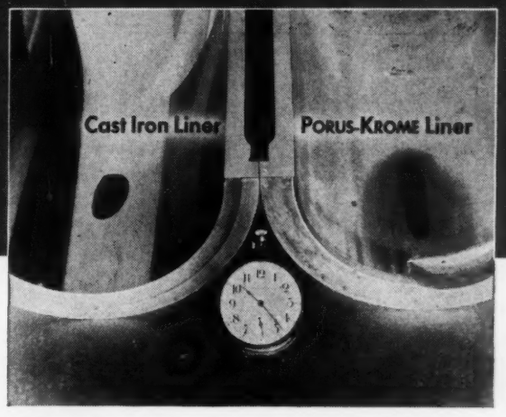


Here's one reason why

PORUS - KROME

multiplies cylinder life





The porosity of PORUS-KROME assures better lubrication. The tiny pores and channels in its surface serve as reservoirs for lubricating oil, feeding it back to the surface as needed. PORUS-KROME "wets" with oil many times better than cast iron does . . . and these photographs demonstrate that the rate of dispersion is a function of porosity.

Drops of oil (as shown above) are placed on a conventional cast-iron liner and on a liner which has had PORUS-KROME applied by the patented Van der Horst process. Both have been honed to the same degree of smoothness. The time is noted.

Two hours later. We see in the photograph on the right that the oil has dispersed only slightly on the cast-iron surface. On the PORUS-KROME liner, the oil has dispersed over a much larger area.

This, combined with the other characteristics of PORUS-KROME, enables it to multiply the life of cylinder liners from 4 to 20 times . . . and at the same time multiply the life of ordinary rings 3 to 5 times.

In addition to providing a "long-life" cylinder wall surface, PORUS-KROME has many diversified applications. If you have troublesome wear problems on any parts of your machines or equipment, or are seeking a way to give your customers an added value in your products, Van der Horst engineers may be able to supply the solution for you. Write today telling us just what your problems are . . . no obligation, of course. Van der Horst Corporation of America, Olean, N. Y. Plants in Olean and in Cleveland, Ohio.

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST

AN AFFILIATE OF DRESSER INDUSTRIES

Solving Drainage Problems

THE toughest drainage problems —on highways, airports and railways, in big city sewage and water supply systems—have been solved by U·S·S American Welded Wire Fabric reinforced concrete pipe. It has the maximum strength and durability to combat the most treacherous soil and foundation conditions.

The ability of U·S·S American Welded Wire Fabric to aid in load distribution and to withstand heavy stress makes it first choice for strength, economy, efficiency and durability.

Prefabricated in rolls for easy handling, U·S·S American Welded Wire Fabric composed of high yield point cold drawn wires can be accurately placed and spaced in both single and double cage forms and holds its position during pipe construction.

All reinforced concrete pipe made by reputable manufacturers is built to A.S.T.M. standards. When the concrete pipe you use is reinforced with U·S·S American Welded Wire Fabric, it will give you long, efficient, economical and trouble-free service.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

U·S·S American WELDED WIRE FABRIC

MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

TRUCK-ENGINEERED **Stamina!**

"... an Excellent Long-Term Investment"

THERE'S sound dollars-and-cents reasoning behind the selection of Ford Trucks by so many highway and airfield construction contractors.

Ford Truck sturdiness and reliability are facts which can be verified by merely asking any one of hundreds of fleet owners. And the moderate cost of the Ford Truck, and of whatever replacement parts you may later require, commend these rugged vehicles to every operator who must keep his overhead aggressively competitive.

Mr. R. C. Larson, president of the Brookfield Company, of Astoria, Oregon, one of whose Ford Trucks is pictured above, at work on Oregon's Nehalan Highway, sums up his experience in typical Ford fleet-owner style in a letter:

"We do not hesitate to recommend Ford Trucks as an excellent long-term investment. We have been using them since 1941, beginning with two. At the end of 1944 we were operating six truck mixers. They have proved very satisfactory during the four years we have operated them steadily."

Such performance has made Ford first choice of America's truck operators. Doesn't it strike you as ample reason for giving serious thought to new Fords for *your* fleet?

They're available now, in limited quantities, for essential civilian service. See your Ford Truck Dealer without delay.

Ford

FORD ADVANCED TRUCK ENGINEERING

More Economy • More Endurance
Easier Servicing

A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground pistons with 4 rings each, for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW rust-proofed valve springs • NEW efficiency in cooling • in carburetion • in lubrication • Far-reaching ADVANCEMENTS in ease and economy of servicing operations.

IMPORTANT FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Heavy-duty front axle • Extra-sturdy full-floating rear axle with pinion straddle-mounted on 3 large roller bearings • 3 axle ratios available • 2-speed axle available at extra cost • Powerful hydraulic brakes, exceptionally large cast drums • Long-lived needle bearing universal joints • Rugged 4-speed transmission with NEW internal reverse lock.

FORD TRUCKS

AND COMMERCIAL CARS

TRUCK-ENGINEERED • TRUCK-BUILT • BY TRUCK MEN

COFFING'S "Super-Man" SAYS:

"I may be a funny looking guy, but I'm proud of my physique. My head is spurred for efficiency. My body is electrified with strength and energy. My arms and legs are powerful and untiring and can do all your lifting and pulling jobs with an ease that is astounding. Right now I'm working for Uncle Sam, but I'll soon be free to work for you. Ask my boss about the thousand-and-one jobs I can do for you and what a help I'll be in the post-war period."

Our new folder describes Coffing Products that will be available for your peace-time needs.

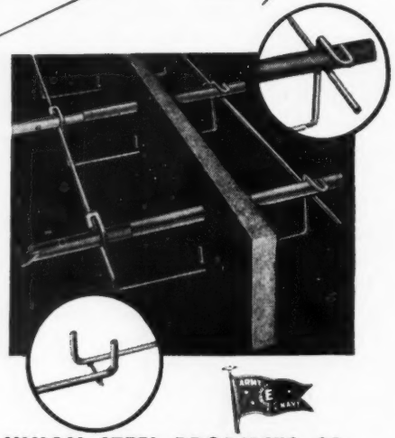
WRITE FOR FOLDER NO. D-4

COFFING HOIST COMPANY

RATCHET LEVER HOISTS - SPUR GEAR HOISTS - ELECTRIC HOISTS
LOAD BINDERS - DIFFERENTIAL HOISTS - TROLLEYS

DANVILLE, ILLINOIS

BUILD *Faster-*
BUILD *Better*
WITH
"QWIK-LOCK"



EXPANSION JOINT ASSEMBLIES

Quick installation . . . foolproof functioning . . . dependability. That's what you get with *"QWIK-LOCK"* Expansion Joint Assemblies. They not only assure easy positioning and locking of dowels, but also accurate positioning of dowels parallel to each other and to the subgrade. "QWIK-LOCKS" are designed for better road building, faster construction, and lower costs.

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Write for the Catalog of Construction Accessories today.

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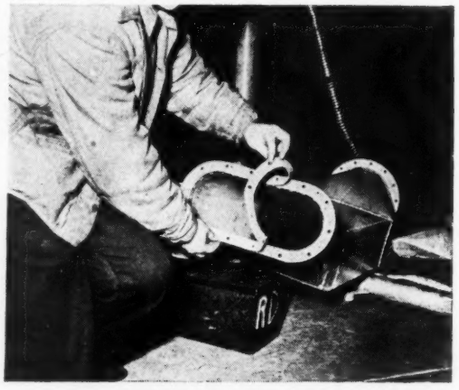
100 Hooper St., San Francisco, California

has gage to determine length of insulation to be removed and permits wire to be inserted in an opening with markings which correspond to wire size for accurate stripping of insulation. Wire, stripped correctly by this all-purpose tool, may then have correct size terminal placed in position for crimping by tool. Latter operation is accomplished by simple hand pressure and insures even, close contact at all points. No solder is necessary and thus cause of a common fault in electrical wiring is eliminated when solderless terminals are installed, as a lasting contact is then assured. One hundred solderless terminals of most-used types for wire sizes 22 to 10 are supplied with this inexpensive repair kit. Included are ring tongue, line splice butt connectors and spade tongue terminals.—**Aircraft-Marine Products, Inc., Harrisburg, Pa.**

★ ★ ★

NEW TYPE GASKET, designed to replace those formerly made of rubber, consists of a felt base impregnated with a chromate pigmented compound which renders material flame and fire as well as corrosion resistant. Originally used for sealing joints in air ventilator lines, forced draft blowers and similar equipment, chromate gasketing is now employed in flange-to-flange joints in



drainage, fire main, fresh water, flushing, sprinkling, plumbing, fuel oil and diesel oil systems. It may be used for watertight or oiltight connections to structures and as gasketing for air lock doors, air lock relief valves, joiner doors, refrigerator doors and flame resistant closures. Will maintain air pressures up to 25 lb. per sq. in. at normal temperatures. In addition to fire and flame resistance, it is not affected by fuels and has definite rust inhibiting properties. It is dark green in color and is available in ⅛ and 1/16-in. thicknesses.—**Sherwin-Williams Co., Brown & Lister Aves., Newark, N. J.**

★ ★ ★

CENTER-HOLE HYDRAULIC PULLER called the Simplex-Jenny, pulls straight, vertically or horizontally, without side thrust, its action being identical with that of any hydraulic ram in that the ram is raised or pushed out by operating the pump. In the case of the Jenny, this ram is tubular. Therefore, when a bolt or rod is inserted through the ram and one end secured over the ram head, as the ram extends, the rod is pulled in through the Jenny. Weight (100-ton model weight 72 lb.) makes this device practical for use on craneways, catwalks and other out-of-the-way places where weight is an important factor. In addition to being a hydraulic puller, the Simplex-Jenny is also a lifting and pushing jack and a portable press. Five models are available ranging from

TODAY SURE

Look into the advantages of the SARGENT OVERHEAD

The Sargent Overhead is a great machine for digging up and loading hard pavement . . . Stripping topsoil is a cinch with the Overhead . . . But it really shines as a one-man snow loader that works all year 'round.

There are two good methods of learning the advantages of the Sargent Overhead: watch one work, and ask the owner about his machine. If you'd like to know where a Sargent Overhead is located in your neighborhood phone your nearest Cletrac dealer.

You'll be surprised at the number of jobs the Overhead does well, from digging up and loading hard street pavement, to loading frozen snow; from grading new country roads, to digging basements; from easy loading in a gravel bank, to clearing and grubbing for a new development.

And your dealer will tell you how easy it is to move the Sargent Overhead on a small truck or trailer or under its own power. He'll tell you that it's the best of the tractor loaders because it works with a straight line motion,—there's no twisting and turning to ruin the tractor running gear. And he's right!

Manufactured by

MAINE STEEL

INCORPORATED

SOUTH PORTLAND, MAINE

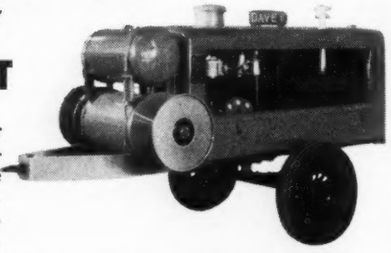
IN CONSTRUCTION . . FOR WAR OR FOR PEACE ACCENT IS ON *MOBILITY*

OUR Armed Forces are using highly mobile equipment like this in war construction work . . . furnishing compressed air for power tools . . . electricity for emergency welding jobs in the field and area lighting for "around-the-clock" operations.

This particular unit is equipped with a Davey Auto-Air Compressor-Welder-Lighting combination and all power is supplied by the truck's engine through the Davey Heavy-Duty Truck Power Take-Off. The truck *speeds* men, materials and tools to the job—provides *immediate* power to do the job.

You can do the same to get jobs done faster . . . save manpower, engines, space, maintenance and original cost. One of three Davey Auto-Air combinations . . . the compressor, the compressor-welder, or the compressor-welder-lighting generator . . . all engineered to work with the Davey Heavy-Duty Truck Power Take-Off—can be mounted on your truck locally or at the factory.

FOR THE L-O-N-G JOB . . . USE THE DAVEY AIR-ARISTOCRAT



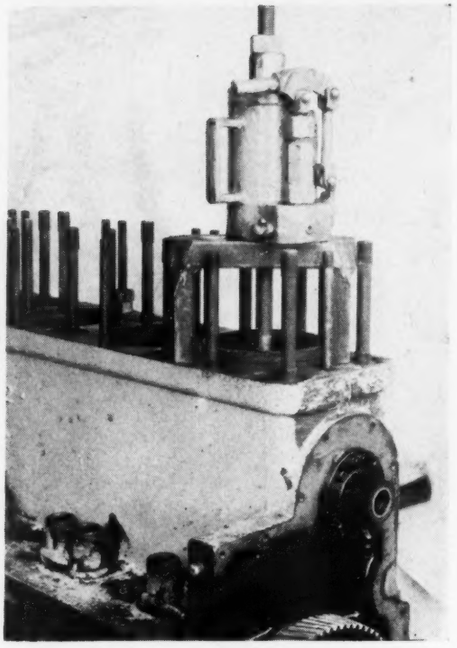
Davey portable compressors offer uninterrupted service at lower ultimate cost for the jobs that require air for days or weeks. Davey Air-Aristocrats are built for any type construction job, and for maximum efficiency in any climate.

Available in 60, 105, 160, 210 and 315 cfm capacities . . . direct driven . . . gasoline or Diesel powered . . . five mountings to choose from.

Complete Your Engineering Library
For detailed information on the complete line of Davey Compressors, Truck Power Take-Offs, Pneumatic Saws, and additional pneumatic engineering data, write today for your free copy of the Davey Catalog E-172. D-145-7

DAVEY *Compressor Co.*
KENT · OHIO

DEALERS IN PRINCIPAL CITIES



30- to 100-ton capacity. Three models have single pumps and two have high and low speed pumps which can be operated separately, alternately or together.—**Templeton, Kenly & Co., Ltd., Chicago 44, Ill.**

Easier Way To Remove Lime Scale From Diesel Cooling Systems

Built-up lime scale in water jackets or radiators is a frequent cause of over-heating in Diesel and gasoline power units. Scored cylinders, loss of power, increased consumption of gasoline and oil . . . any or all may be indications of this condition.

Preventive maintenance is the answer to this common trouble. Treat cooling system periodically with Oakite Compound No. 32. Its dissolvent action QUICKLY, effectively removes lime scale and rust that impair proper heat transfer . . . restores cooling system to normal operating efficiency. Write for FREE helpful 28-page manual containing specific recommendations for this important maintenance job.

OAKITE PRODUCTS, INC.
24G Thames St., New York 6, N. Y.

Technical Service Representatives Located in All principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**

AFTER SEVEN YEARS...

No shrinkage . . . No leaks

LEHIGH MORTAR CEMENT

● In seven years, nothing has changed but the daily "features." The building is as good as the day it was completed . . . no leaks, no efflorescence. Lehigh Mortar Cement was used.

Through many years of successful use, Lehigh Mortar Cement has proved its performance with all types of building units. It has all the qualities required by the owner, the architect and the engineer, the contractor and the bricklayer . . . and it surpasses the most exacting specifications by a wide margin.

Our Service Department is active continuously in helping contractors solve problems involving cement. Write to us.

K. H. KETTLEHUT
GENERAL CONTRACTOR
WEST LAFAYETTE, INDIANA

July 2, 1945

Lehigh Portland Cement Company
Chicago, Illinois

Gentlemen:

In 1938 I built in Lafayette, Indiana, the Lafayette Theatre Building. I have watched this building with a great deal of pride, and very happy to inform you that Lehigh Mortar Cement was most satisfactory.

Due to this fact, I have continued its use on various other projects, with equal satisfaction, and would not hesitate to recommend its use on any building units where mortar cement is required.

Yours very truly,

K.H. KETTLEHUT

KHK/bw

Lehigh CEMENT

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

ROGERS *GIRDER TYPE*

the BETTER trailer for your BIGGER hauling jobs

THIS trailer, designed by Rogers Brothers to meet low headroom conditions, has been used for some time in certain sections of the country. Now, because of the larger equipment in use, it is coming into extensive use elsewhere.

ROGERS BROTHERS CORP. ALBION, PENNA.

EXPERIENCE *builds 'em* PERFORMANCE *sells 'em*

A big mouthful with every bite

In dirt, clay, coal, gravel or ore you can rely on one of the tough, properly designed, Brownhoist buckets to take a full load with every bite. Extra large sheaves reduce rope wear to a minimum. Brownhoist Buckets are available in rope-reeve, power-wheel and link type. For prices and further facts write INDUSTRIAL BROWNHOIST CORPORATION, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

ASPHALT TYPES OF ROAD CONSTRUCTION—**The Texas Co.,** 136 E. 42nd St., New York 17, N. Y. (24 pp., illustrated) Contains step-by-step descriptions of those types of road, street and airport construction in which asphalt is applied by pressure distributor trucks. Explains how to construct standard and modified types of asphalt penetration macadam paving. Describes road-mix method of building low-cost asphalt surfaces. Outlines proper procedure for surface treating roads with asphalt surfacing material, emulsified asphalt and asphalt cement. Useful tables for use of roadbuilder also are presented.

★ ★ ★

HIGHWAY MAINTENANCE—**Highway Research Board,** 2101 Constitution Ave., Washington 25, D. C. (26 pp., illustrated). Report No. 10 "Salvaging Old High Type Flexible Pavements," of series on wartime road problems describes methods of patching, widening, making temporary repairs or applying temporary resurfacing while awaiting deferred construction, and laying substantial resurfacing where reconstruction is not anticipated. Pamphlet includes table of principal uses of various grades of asphalts and tars, and appendix gives condensed typical specifications for bituminous paving mixtures.

★ ★ ★

PAINT FOR ASPHALT ROOFING—**A. C. Horn Co.,** 43-36 10th St., Long Island City 1, N. Y. (4-p. folder, illustrated) Describes and illustrates asphalt coating combined with pure aluminum and called "Hornlume" for use on asphalt roofs to protect them from rays of sun which cause them to smoke, bubble, melt and run. Both coating and integrally contained aluminum are brushed on roof at one time. Separation then takes place, asphalt sinking down to take up its bad weather job of protection at bottom of coating next to and bonded to the roof, and aluminum staying at top facing sun and reflecting back its ultra violet rays. New paint is a protector and deflector, some roofs showing temperature difference inside and out of as much as 22 deg. and remaining free from checks and cracks.

To date, we have found 75,482 mechanics and drivers who wanted to be right, and more than 5,000 operators — responsible for over 300,000 vehicles — who wanted to know how to keep 'em running.

All of these men have been contacted in 1,704 meetings held in various sections of the country by Timken Axle Regional Representatives.

This unique service is rendered without charge. It assures maximum performance from Timken Axle-equipped vehicles. It provides us with a constant source of operating data from the field. It makes available priceless help to vehicle manufacturers, factory branches, dealers, and operators. This kind of practical assistance aids in selling vehicles, insures better performance and cuts maintenance cost.

You Can Help, Too

When buying new vehicles (1) analyze the job that each truck must do; (2) study specifications, and buy your trucks to fit your jobs; (3) protect your investment by good maintenance and careful operation. If you do these three things, you'll insure better service and more profit.

Vehicle manufacturers will be ready soon with new equipment to meet all your needs. And Timken will be ready with the finest line of axles incorporating the greatest advances in the history of the axle industry. Ask about the axles when you buy. Be sure you get Timken Axles.

TIMKEN AXLES

TIMKEN AXLES

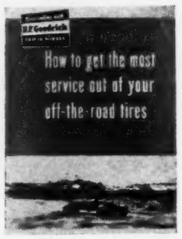
THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICH.
WISCONSIN AXLE DIVISION • OSHKOSH, WISCONSIN

CUT SHOVELING COSTS
2 WAYS!
1 MOVE MORE MATERIAL PER DAY: Because of its special construction with tapered blade thickness and tubular shank, RAZOR-BACK gives you a perfectly balanced shovel of full 13 gauge strength but only 15 gauge weight. Speeds handling of material.
2 REPLACE FEWER SHOVELS PER YEAR: In addition to its long center "backbone" of 13 gauge steel, which reinforces cutting edge, frog and socket, every RAZOR-BACK is "Surface Peened" after heat treatment, actually tests 2½ to 5 times tougher than fine shovels merely heat treated.
Forged in One Piece, with Extra Long 11 in. Socket.
Send for Catalog, Prices and Distributor's Name
THE UNION FORK & HOE CO.
650 Hocking St., Columbus 15, Ohio
SURFACE PEENED
RAZOR-BACK
THE SHOVEL WITH A BACKBONE
ALSO STONE, BALLAST, INDUSTRIAL FORKS — ASPHALT AND ROAD RAKES

Materials
PROCESSING
EQUIPMENT
Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.
The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by
MERCER-ROBINSON, CO., INC.
30 CHURCH ST., NEW YORK 7, N. Y.
Materials
HANDLING
EQUIPMENT
Trailer Trucks (All Types) Wheel Tractor Cranes (3 to 7 ton) Fork Lift Trucks, Lift Platforms, Hoists, Live Skids, Wheels, Casters.

STEEL CABLE—**R. G. LeTourneau, Inc.,** Peoria, Ill. (17 x 22-in. wall chart) Gives cable requirements for all LeTourneau equipment for use of operators and maintenance men. Stresses service angle and gives practical tips on how to get longer service from wire rope. Ideal for hanging on field office or shop wall. Copies of this chart are available free to those interested.

★ ★ ★



TIRE SAVING HINTS—**B. F. Goodrich Co.,** Akron, Ohio (48 pp., illustrated) Entitled "How to Get the Most Service Out of Your Off-the-Road Tires," this booklet describes, with text and pictures, each of the off-the-road lines of tires manufactured by this company for specific services. Reasons for particular constructions to meet the exacting requirements are explained. Hazards encountered by each type are pointed out and methods to avoid them suggested. Featured are 17 pages devoted to preventive maintenance treating such subjects as "How Load, Inflation and Operating Conditions Affect Tire Cost," "Effects of Overloading," "Overinflation" and "Underinflation," "Bleeding Tires," "Care of Valves," "Haulage Roads," "Road Maintenance," "Hazard Areas," "Tire Clearance" and "Effects of Water." A "don't" section is included in the booklet outlining what not to do if tires are to deliver their maximum service. Suggestions for laying out, constructing and maintaining the haulage road are included. Proper matching of dual tires is illustrated and discussed. Correct procedure in mounting synthetic tubes and flaps is described. Tables list recommended speeds and tireloads at various inflation pressures for each size and type of tire and sizes, loads and dimensions of each tire. Also listed are recommended speeds and tire loads at various inflation pressures for each size and type of tire.

★ ★ ★

PILE ENCASING—**The Presscrete Co.,** Graybar Bldg., New York 17, N. Y. (2 pp., illustrated) Describes and illustrates Weber system of Presscrete pile encasing for safe, permanent protection of wood piling against destruction by teredos, limnoria, and other marine hazards, including abrasion, impact and fire; for restoring decayed or weakened piling to original or increased strength and stability; for reconditioning of defective concrete piles and for protection of steel piling against deterioration by rusting. Presscrete consists of silicified concrete of extreme density and hardness applied by pneumatic pressure in hermetically sealed pressure forms from which entrapped water has been ejected by compressed air, so that admixture with obnoxious waters is made impossible. Encasement is usually from 2 to 4 in. thick and reinforced with wire mesh or any other suitable kind of steel reinforcement. Properly mixed and pre-hydrated plastic material composition is placed in the forms by Weber concrete injection method with working pressure from 5,000 to 8,000 lb. per sq. ft. Material being injected into the form bottom is forced upward and compacted within the form space surrounding the pile. Pressure head of form is equipped with necessary fixtures for control of entrapped air and counter-pressures. Perfect contact of the pile encasement is thus secured and hollow spaces, sand pockets or honeycombs are safely eliminated. Steel forms are removed for re-use as soon as Presscrete is sufficiently hardened to permit their safe release.

Made for the Job...

Do not overlook the versatility of a LIMA shovel when buying excavating machinery. There are places and purposes where only a power shovel is the answer to your problem. LIMA shovels are designed to work in wet, muddy ground and tough rock digging as well as dry, loamy dirt. With a LIMA you are prepared to dig earth, rock, coal, ore, clay and many other types of material with assurance of big output regardless of the type of work. In addition to having a fast economical excavator you also have in a LIMA, a material handling crane, pull-shovel or dragline by simply changing front end equipment. When you buy for the future buy an all purpose LIMA and be prepared for any job.

Write for a free bulletin TODAY!

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ST. LOUIS, MISSOURI
MONTREAL, QUEBEC, CANADA
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PORTLAND, OREGON
SAN FRANCISCO, CALIFORNIA
LOS ANGELES, CALIFORNIA
MINNEAPOLIS, MINNESOTA
SEATTLE, WASHINGTON
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LIMA

WITH LIMA

GET THESE ADVANTAGES

INDEPENDENT CLUTCHES
ANTI-FRICTION BEARINGS
EXTRA BIG DRUMS
SPLINED SHAFTS
SQUARE LEVER SHAFTS

SHOVELS ¾ Yd. to 5 Yds. | CRANES 13 Tons to 100 Tons | DRAGLINES Variable

A TYPE AND SIZE FOR EVERY JOB

HOW B-G CONVEYORS ACHIEVE HIGH CAPACITY AT LOW COST!

• You can stockpile material with less equipment, less horsepower, and less cost than by any other method when you use a Barber-Greene Portable Conveyor.

Capacity is high because material is kept on the move—*continuously*. B-G Conveyors handle the maximum output of crushers easily . . . help you make the most of limited space. Swiveling trucks permit storage in a large semicircle without disturbing the original installation.

To bring your stockpiling costs still lower, this same B-G Conveyor can be used to reclaim your pit and quarry products when the time comes.

If frequent setups, knockdowns, and rearrangements are required, you'll find, too, that a B-G Portable Conveyor saves time, labor and expense.

The sturdy construction of a B-G Conveyor gives you many extra years of service. Standardization of parts assures you of correct and permanent alignment. Belt life is prolonged . . . maintenance costs are negligible.

There are many types and sizes of Barber-Greene Conveyors, portable and permanent, for every material handling job. Barber-Greene Company, Aurora, Illinois.

45-21B

Barber B-G Greene

Constant Flow Equipment

Special Tip on Automatic Torch

(Continued from page 91)

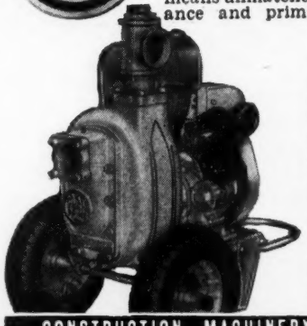
snow plow blades are built up by welding together soft steel plates salvaged from old blades after the hardened edges have worn away. The plates are ½ in. thick. After assembly by stagger welding of the lap seams, as indicated by a photograph, the built-up blade is fastened by C-clamps to an I-beam jig parallel with the track of the traveling torch for heat treatment. Tests were run and samples were cut from heat-treated plates to determine the optimum operating speed (7 to 8 ft. per min. for the shop apparatus) to produce hardening to one-half depth at the cutting edge, tapering to zero on the cutting face about 2½ in. above the edge, and the machine's operating rate is adjusted to

(Continued on page 144)

They Can Take It

DUAL PRIMERS

When it comes to DURABILITY, CMC Dual Primers have the "guts" to stand up to those tough, steady 24-hour grinds. DUAL PRIME means unmatched performance and priming speed.



A husky 3" CMC Dual Prime. One of the complete line from 1½" to 10" sizes. Also 3" and 4" Diaphragms. Get catalog.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa
Mixers • Pumps • Hoists • Batching & Placing Equipment • Saws • Carts • Barrows

Economical—no fittings required.
Lightweight, flexible, easy to use.
Use of endless ropes in braided body eliminates conventional eye splices.
Use them in a basket or in an inverted basket hitch.
Buy them singly or in pairs.
Faster delivery than other slings because you don't have to wait for fittings.

Keep Production Moving! Use

MACWHYTE ATLAS *Loop-Eye* BRAIDED WIRE ROPE SLINGS

These sizes and strengths can be made in the lengths you need:

Write on your company letterhead for Macwhyte Sling Catalog and pictorial literature. Address Macwhyte Company or any of our distributors and mill depots near you.

* 8-part Atlas Braided Slings have a body approximately 4½ times the diameter of the rope used.

Buy More War Bonds—
Hold what you have!

Diameter* of Rope Used Inches	Breaking Strength in Tons of 2000 lbs.
3/32	2.47
1/8	3.86
3/16	8.57
1/4	16.24
5/16	25.20
3/8	35.28
7/16	47.04
1/2	60.48
9/16	75.60
5/8	92.96
3/4	132.72
7/8	180.32
1	235.20

MACWHYTE COMPANY

1 Fourteenth Avenue, Kenosha, Wisconsin
Manufacturers of the correct wire rope for your equipment
Left-&-Right Lay Braided Slings · Aircraft Tie-Rods
Aircraft Cable · "Safe-Lock" Swaged Terminals
Mill Depots: New York · Pittsburgh · Chicago · Ft. Worth
Portland · Seattle · San Francisco
Distributors throughout the U. S. A.

NO. 789-S

When larger cranes are built, Macwhyte ATLAS Braided Wire Rope Slings will be made to meet their capacity.

ARMY E NAVY

Member National Safety Council

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Nitro Starch Base

HIGH EXPLOSIVE EFFICIENCY

IN MINING · QUARRYING · LOGGING · CONSTRUCTION

Plus THREE ADVANTAGES FOR YOU!

1 WILL NOT PRODUCE HEADACHES from handling . . . reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!

2 WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency . . . anywhere . . . anytime!

3 WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!

EXPLOSIVES 1905 TROJAN 1945 CHEMICALS

• Increased efficiency during and after all blasting operations; greater safety and comfort for your workers — that's what Trojan's three advantages will do for you. Throughout the World, under all kinds of climatic conditions, Trojan Explosives perform with uniform superiority.

TROJAN POWDER COMPANY

One of America's Oldest High Explosives Manufacturers

PLANTS: SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION

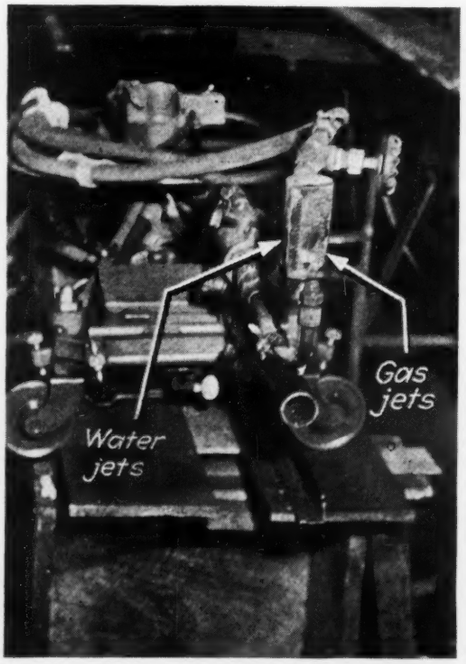
OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

SALVAGED SNOW PLOW BLADES from which worn edges have been cut are welded together to form new blade which will be heat-treated along cutting face by automatic machine. Welder is depositing metal from Airco heavy-coated ¼-in. mild steel electrode, using reverse polarity with current from Wilson welding generator.

(Continued from page 142)

this speed to produce the desired hardening effect.

Maintenance operations of the New Hampshire Department of Highways are under the direction of Le Roy F. Johnson, maintenance engineer. Earl M. Sawyer, superintendent of the equipment division, is in charge of the maintenance shop.



HEAT-TREATING TIP on automatic traveling torch has two rows of perforations at forward edge for flame brush and two at rear edge for water spray.

Model F8C Cam and Roller Hoist with Type W12 Body. Capacity 5 cu. yds.

One-way side dump body with dual hydraulic hoist. Automatic downfolding side.

Always Good!

NOW BETTER THAN EVER

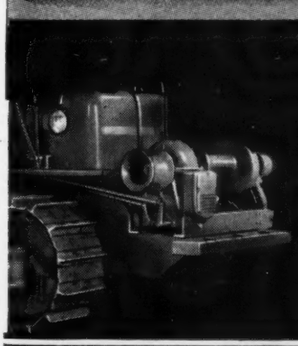
GAR WOOD

CONSTRUCTION EQUIPMENT

For nearly three decades Gar Wood inventive genius, advanced engineering and high quality manufacture provided the world's finest medium and heavy-duty construction equipment. Then came the period when Gar Wood bodies, hoists, winches, etc., were made for one customer—Uncle Sam. Notable mechanical improvements and even greater strength were engineered and built into these rugged units to give them a new high in performance and efficiency.

And now, with civilian production about to be resumed, Gar Wood will build still better construction equipment . . . with greater values, and longer life than ever before.

BUY MORE BONDS . . . AND KEEP 'EM



↑ 4-Wheel Cable Scraper—capacities 11, 15, 20 and 25 cu. yds. Rolling ejection. Accurate spreading.

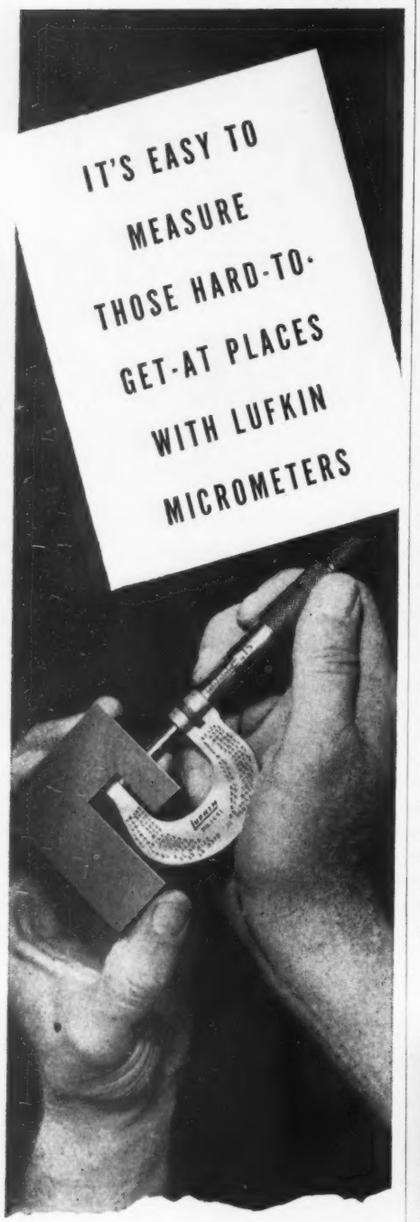
← Tractor or utility winches.

Extra heavy duty type → X112 rock body with open or scoop-end. Hydraulic, twin telescope hoist Model T-4440.

GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICH. WORLD'S LARGEST MANUFACTURER OF TRUCK AND TRAILER EQUIPMENT

HOISTS AND BODIES • WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS



The frame of the Lufkin Micrometer has been re-designed so that the end nearest the anvil tapers gracefully to a narrower width. Now, with a Lufkin mike you can measure those hard-to-get-at surfaces where clearance is small. Lufkin mikes combine accuracy with quality and superior workmanship. See them at your dealer's. For free catalog write THE LUFKIN RULE CO., SAGINAW, MICHIGAN, New York City

LUFKIN
FOR ACCURACY

Free Standing Scaffold

(Continued from page 72)

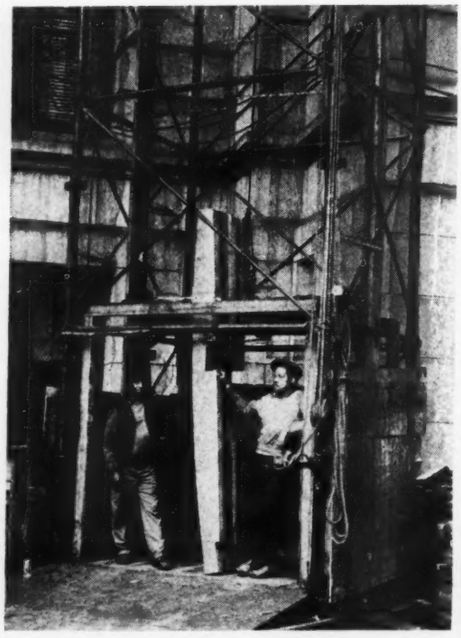
facsimile, so far as appearance goes, of more durable character. Molded wood blocking is bolted to the ribs, as shown by several of the accompanying pictures, to reproduce the general profile of the original exterior, and this blocking is covered with 6- and 8-lb. sheet lead ornamented in the same manner, but not quite so elaborately, as the terra cotta.

Ludowici Roman green roof tile, placed between the ribs on the dome in 1913, when the entire capitol was reroofed, is still in good condition and does not have to be removed. At the base of the dome, a terra cotta band course, or cornice, is being replaced with granite.

On the cupola, the roof, columns and exterior walls have been stripped of terra cotta. Concrete has been placed on the cupola roof, with wood sleepers, and the roof and roof ribs are being covered with sheet lead. Exterior columns and walls of the cupola are refaced with limestone, and a railing at the base is being replaced with a design more appropriate to the architecture of the capitol.

All wood used in the renovation of the

(Continued on page 152)



APPROVED MAN HOIST in 250-ft. tower handles both workmen and materials between ground and five runways serving main platform levels of dome scaffolding.

adeco...

NOZZLE TESTER

Keeps Diesel Engines Running Efficiently

To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

Light in weight yet built for heavy-duty service, it enables any mechanic to make quick accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Tests both large and small injectors, on bench or engine, at pressures up to 10,000 p. s. i. Prevents costly delays and possible damage to engine.

Ideal for testing hydraulic devices.

TESTS FUEL INJECTORS AND HYDRAULIC DEVICES at Pressures up to 10,000 p.s.i.

Write for bulletin on this practical, low-cost unit.

ADECO AIRCRAFT & DIESEL EQUIPMENT CORP.

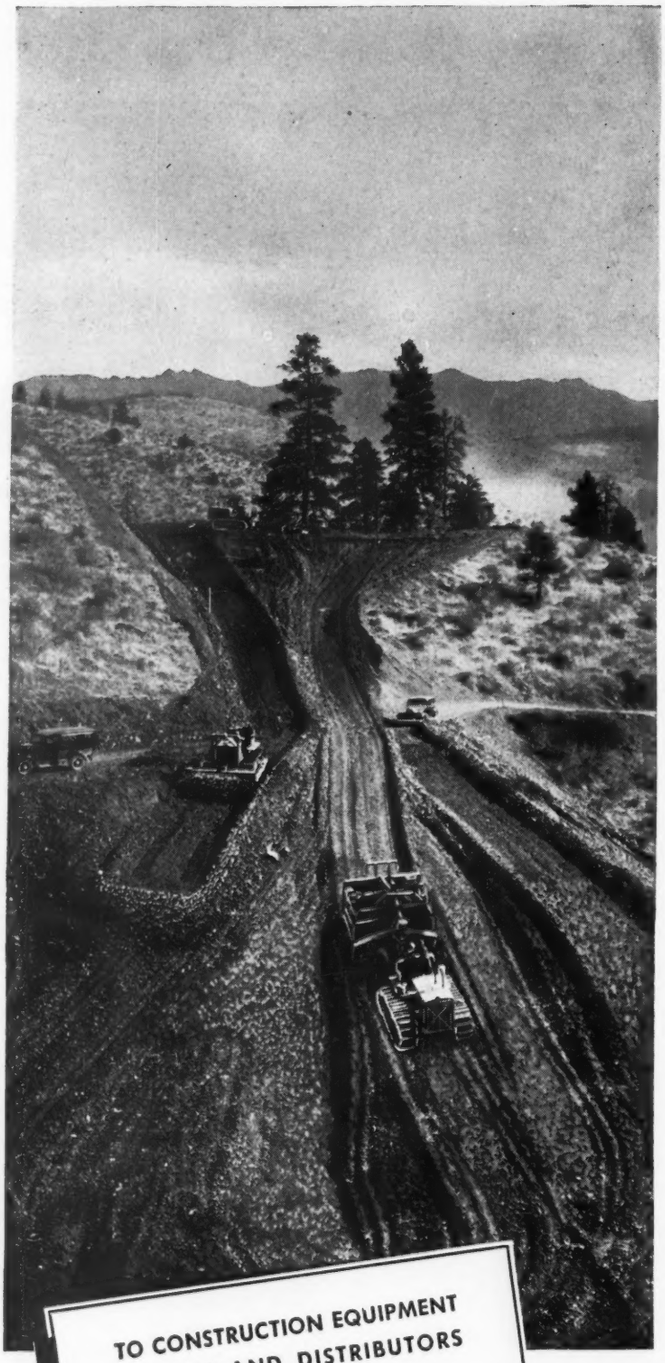
DEPT. 1: 4411 N. RAVENSWOOD AVE.
CHICAGO 40, ILLINOIS

Speed Vital Equipment back on the Job

. . . WITH FASTER TOOLS FOR EVERY SERVICE OPERATION

With equipment taking a punishing beating, *minutes count* on every job of maintenance and repair. Fast, efficient Snap-on tools *for every service operation* help keep vital equipment on the job . . . help speed construction by making short work of repairs and adjustments. From smallest service tools to extra-heavy duty and jumbo wrench sets the Snap-on line answers every hand tool need. Snap-on's direct-to-user tool service is available through 38 factory branch warehouses. A Snap-on representative will gladly call *on the job.* Write for 1945 Snap-on catalog and address of nearest branch.

SNAP-ON TOOLS CORPORATION, 8084-H 28th Ave., Kenosha, Wisconsin



LET'S CONSIDER THE ROAD AHEAD

Whether you bid on highway, railroad or building construction, success may depend on having the right tools to handle the job. Competition will be keen, bidding margins may be narrow. Profits depend on completing contracts on time . . . delays are costly and deadlines won't wait!

More than ever before, contractors need adequate equipment to handle the work that lies ahead. Place yourself in a position to compete and complete! Order available machinery NOW . . . and be prepared to buy the equipment that will be needed later.

Contractors can finance purchases of construction equipment through C. I. T. on a long-term basis at reasonable cost. When the equipment selected is ready for delivery, C. I. T. funds complete the purchase . . . payments to suit your needs can extend over many months . . . machinery helps pay for itself out of earning capacity . . . working funds remain intact.

Any sound business, small or large, can arrange for this financial backing with a minimum of negotiation. If your operating position can be improved through the use of additional capital ask our nearest office to explain how easily the matter can be arranged. Write, wire or 'phone for information.

TO CONSTRUCTION EQUIPMENT DEALERS AND DISTRIBUTORS

C. I. T. offers you a complete financing plan that includes—

Wholesale accommodation for funds with which to stock new or used equipment.

A sales financing plan that makes it easier for contractors to buy from you. Combining low rates, liberal terms and simplicity of operation.

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In Canada:
CANADIAN ACCEPTANCE CORPORATION *Limited*
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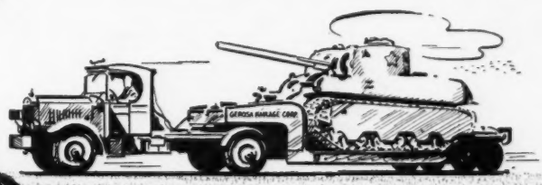
AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

"A tire has to be *tough* in our league..."

FRANK GEROSA, *Treasurer*
Gerosa Haulage & Warehouse Corp.
New York, N. Y.

● "Our trucks tote valuable cargo in all weather and under all road conditions. Neither we nor our customers can afford to have a tire go out on us. After exhaustive—and costly—experimentation we've selected Armstrong Tires. In our league tires have to be plenty tough—and these Armstrong's are as tough and long-lasting as they come. We know they are dependable, give us more mileage and are priced right. We don't know of a better tire—and you can quote us!"



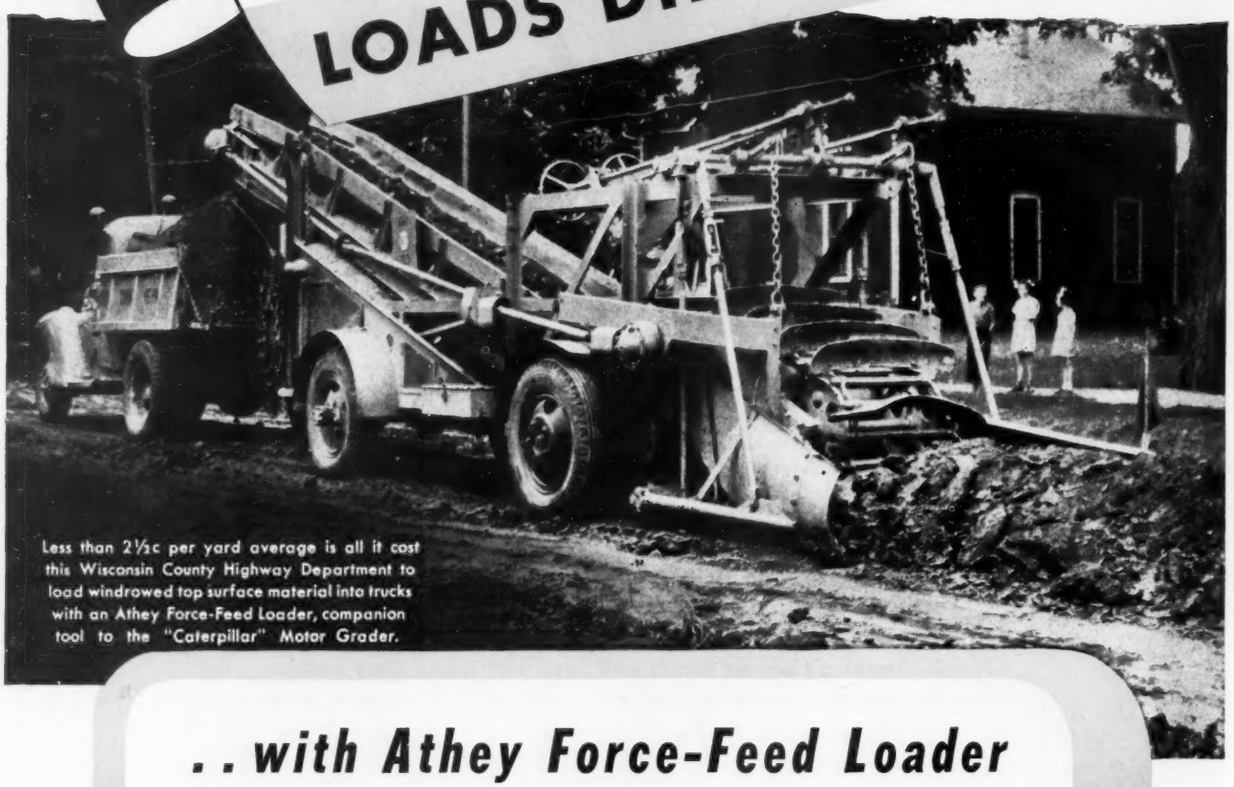
WE didn't write that—Mr. Gerosa did! Scores of other commercial car operators have discovered, as he has, that you can't buy a better tire than an Armstrong. It's long on performance, sturdiness and mileage—yet short on cost. For more than thirty years Armstrong technicians have developed and built into our products new features that make for longer tire life, an accomplishment that spells economy to the buyer who has both mileage and cost in mind.

For literature or information write your Armstrong distributor or to Armstrong Rubber Company.

ARMSTRONG TIRES

Manufacturers of Quality Tires and Tubes Since 1912 · General Offices and Plant—460 Elm Street, West Haven 16, Conn.

DODGE COUNTY LOADS DIRT CHEAP!



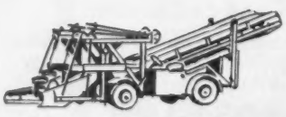
Less than 2½c per yard average is all it cost this Wisconsin County Highway Department to load windrowed top surface material into trucks with an Athey Force-Feed Loader, companion tool to the "Caterpillar" Motor Grader.

. . with Athey Force-Feed Loader

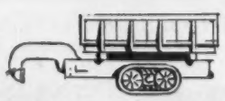
For faster, lower-cost removal of approximately 5,000 cubic yards of material on the grading of a county highway through Fox Lake, Wisconsin, alert highway engineers put an Athey Force-Feed Loader on the job. Result: a cost-cutting loading record of less than 2½c per cubic yard!

Like Dodge County, other busy highway departments around the country are turning to this newer, modern method of speeding material handling on such jobs as ditch cleaning, road widening and straightening, slope trimming, road grading, building and relocating ditches, salvaging top soil and loading oil mix.

Let your Athey-"Caterpillar" dealer explain the many advantages of the Force-Feed Loader for highway maintenance and construction work, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.



FORCE-FEED LOADER



FORGED-TRAK TRAILERS

MOBILOADERS

Athey

DEPENDABLE LOADING AND HAULING EQUIPMENT

Zoned Equipment

SPEEDED THE JOB . . . GAVE CONTRACTOR THE "EDGE"

IT WAS a hurry-up job, and Winkelman* did it! . . . because it was organized with equipment thoughtfully "zoned" according to the sphere for which each unit was best suited. That's how the moving of 2½ million yards of earth for the Natchez Airport was accomplished quickly and at low cost.

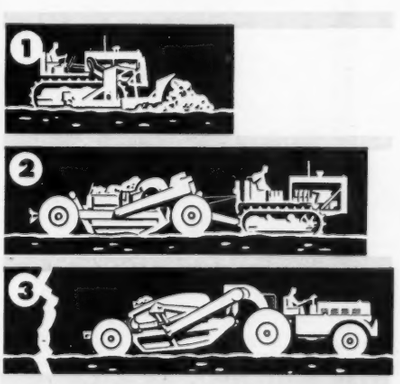
Cuts ranged up to 25 feet; fills to 44 feet; hauling distances to 1800 feet. For fastest and most economical operation, all three modern methods were used: (1) *Track-type tractors and bulldozers* for the "pushaways"; (2) *Track-type tractors and large-capacity carry-type scrapers* for the shorter hauls; (3) *Wheel tractors and pushdozer-loaded scrapers* for the distance hauls.

23 out of the 24 track-type tractors used were "Caterpillar" Diesels.

All 11 of the wheel tractors were "Caterpillar" Diesel DW10's

The 7 motor graders used were "Caterpillar" Diesels.

*D. W. Winkelman Co., Inc., contractor. Illustration shows only a small portion of equipment used on project.



Wagons, bulldozers, rollers, scarifiers, distributors, mixers and minor pieces completed the well-rounded equipment for handling this and similar large-scale projects with efficiency—and with minimum risk of underestimates or delays.

"Caterpillar" builds the power units you need to zone your equipment for

LOWEST COSTS ON EARTH

There are "Caterpillar" Diesel track-type tractors, wheel tractors, motor graders and engines—all in the right models or sizes for a wide range of earth-moving jobs.

Thus, the contractor who "goes one hundred per cent 'Caterpillar'" gives himself the further advantage of having all his equipment kept in good serviceable condition by *one* service-dealer organization. It is a *nation-wide* organization—the most complete, conveniently spotted and efficiently equipped of its kind in the world.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The discharged veteran wears this emblem. Remember his service and honor him.

(Continued from page 146)

capitol dome has been immersed in Woodlife toxic water-repellent preservative. In addition, sleepers and other pieces in contact with concrete are given a brush coat of creosote.

Supervision

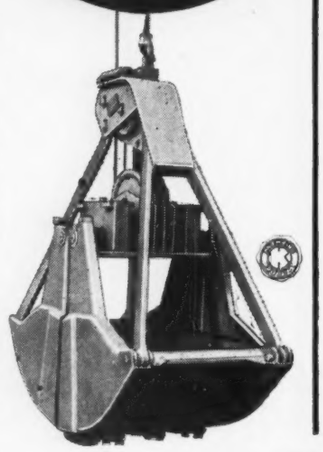
Renovation of the capitol is being carried out under the supervision of the architect, William Gehron, and the Department of Property and Supplies. C. M. Woolworth is secretary, and A. Judson Warlow is chief engineer of the department. Under them, Vincent P. Connelly, structural engineer, is immediately responsible for all work on the capitol dome.

Including all construction and regilding involved in the renovation of the dome, work performed under the general contract of McCloskey & Co., Philadelphia, is expected to total about $155,000. Edward Evans is superintendent in charge for the general contractor.

In addition to the Chesebro, Whitman Co., Inc., supplier and erector of the scaffold, the job includes two other principal subcontractors. The J. Edward Link Sheet Metal Works, Philadelphia, is taking care of sheet metal work, lead cover-

(Continued on page 154)

CLEAN, FAST DIGGING *Plus* LOW-COST MAINTENANCE



IMPROVED JOHNSON *All-Welded* BUCKETS

Day in and day out, Johnson All-Welded Buckets have amazing staying power that matches their outstanding digging power. . . . They're built to last—to give years of hard, continuous service on the toughest jobs—*at minimum maintenance cost.*

Every detail is engineered for permanence. All-welded construction assures lasting strength. Renewable lip edge bar, easily replaced in the field, is made of tough manganese steel to combat wear.

Large diameter guide sheaves and hardened guide rollers greatly reduce cable wear. Needle bearings, sealed against dirt and moisture, assure long life. Lower sheaves are fully protected by heavy, rugged steel plates.

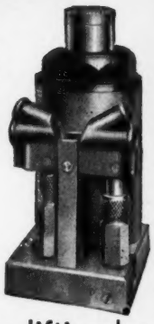
Write today for full information. Johnson Buckets are made in three types—Rehandling, General Purpose and Heavy Digging.

The C. S. Johnson Company
Champaign, Illinois
A Kcehring subsidiary

Clark
PORTABLE ELECTRIC TOOLS

JAS. CLARK, JR. ELECTRIC COMPANY
624 Bergman St., Louisville 3, Ky.

Every Extra Heavy Load Calls for a Simplex Hydraulic



Simplex 50HJ Hydraulic Jack, Capacity 50 tons. Hydraulic lift 7". Has two pumps — high and low speed —which can be operated singly or in unison. No. 30HJ, same design, capacity 30 tons. Also 3, 5, 8, 12 and 20-ton Hydraulic Jacks.

Heavy duty lifting has ceased to be a slow, costly job where Simplex 30 and 50-ton Hydraulic Jacks have been put to work. They have answered construction men's call for more powerful hydraulic jacks. Sturdy, rugged, safe—with non-deteriorating pressure seals, shielded release valve, and an overload safety factor of 50%. Double lever socket speeds operation in close quarters. Can be used in horizontal or vertical position. Sold by leading supply houses everywhere.

ARMY NAVY

Templeton, Kenly & Co.
Chicago (44) Ill.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

For fast and positive action... full visibility... smooth performance ...easy adjustment... minimum maintenance ...insist on

HEIL "engine mounted" CABLE DOZERS

Heil Hi-Speed Cable Scoops give you fast, profitable dirt-moving at low cost.

Heil Hi-Speed Bottom Dump Wagon saves loading time — cuts hauling time — speeds dumping.

This cable-operated, "engine-frame mounted" Cable Dozer has the lifting mechanism mounted on the tractor engine frame to provide a direct overhead lifting operation. Designed through close cooperation with the International Harvester Co. engineering staff, it provides a perfectly balanced team that works as an integral unit.

The raising and lowering action of this unit is faster and easier to control for accurate blade setting. You get a higher lift of the blade which is particularly important in tree dozing, plus a drop that is practically unlimited. With Heil Cable Control there is instant response to movements of the control lever which enables the operator to inch the blade up or down, or to raise it rapidly for pitching action.

Heil design assures you of full benefit of all the power furnished by the tractor — more driving and penetrating power at the blade, and more "pay dirt" moved with each load. For full details and specifications —

R-51

Write for descriptive bulletin.

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Any Way You Look at 'em . . .
STERLINGS EXCEL!

Your Post War Plans Should Call for High Quality Wheelbarrows

Carefully examine every detail of a Sterling Wheelbarrow — tray, braces, wheel, wheel guard, legs and handles. You'll find that Sterlings are engineered and built to take hard punishment over a long period of years. Right now, 100% of our facilities is devoted to essential war production. But we are looking forward to the postwar era when we can again take care of your normal barrow requirements.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

CLIP THIS ADVERTISEMENT

Send for literature on items checked

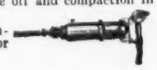
☐ Concrete Surfacing Attachments for all needs

☐ Gas or Electric Concrete Vibrators to meet every placing requirement

☐ Full line of Flood and Shovel Lights (not illustrated).

☐ Vibratory Concrete Finishing Screeds—Models: VS-6 ft.; VS-10 ft.; VS-13 ft.; VS-16 ft.; VS-20 ft.; VS-25 ft. and 26-ft., adjustable for lengths—strike off and compaction in one easy operation.

☐ Electric "Power Blow" Hammer or Spade and Tools for heavy or light duty work.



☐ Portable AC or DC Gas Electric Generator Sets to meet all power, lighting requirements. ½ to 17 KW. Open or housed models.

SPEED YOUR WORK . . .
SAVE MANPOWER . . .
with Master Equipment

"PREFERRED THE WORLD OVER"

Power, portability, simplicity and built-in dependability distinguish all Master Vibrator Company equipment . . . make it the choice of thousands of engineers and contractors wherever work must be done fast, efficiently and at lowest operating and manpower cost. **Immediate delivery.**

Write for litcrature at once!

☐ "TURN-A-TROWEL"

Provides instant change of trowels for floating and finishing concrete with a single machine. Set all trowels at once with one quick variable adjustment. Heavy duty Model 48" diam. and Medium duty Model 34" diam. Gas and Electric Models Interchangeable.

MASTER VIBRATOR COMPANY DAYTON 1, OHIO

Distributors throughout United States, Canada and other countries

Products Include: Portable Gas-Electric Generator Plants, 500 watts to 17,000 watts, Voltage Regulators and Portable Mountings Optional • Master Flood and Shovel Lights • Concrete Vibrators (Gas or Electric) High Speed Tools and Concrete Surfacing Attachments • Big 3—Generators and Tool Equipment • Concrete Vibratory Finishing Screeds • Concrete Troweling Machines (Gas or Electric) • Electric Hammer and Spade, Hammer Tools • Pavement Breaker and Tie Tamper • Back-Fill Tamper and Tie Tamper • Grinding Machines and Tools • Electric Hoist (Export Only).

(Continued from page 152)

ing and incidental roofing repairs. Vincent Maragliotti, New York, is subcontractor for gold-leafing the ornamental ball and finial figure of Miss Penn, which crowns the capitol dome.

William Gehron, architect associated with the Pennsylvania capitol group of buildings for the last 25 years, made all studies and developed the designs for renovation of the dome. In collaboration with the Department of Property and Supplies, he supervises all phases of the construction work.

★ ★ ★

Floating Drydock
FOR SEAPLANES

(Continued from page 69)

these are operated from the deck of a tender barge carrying compressors, air manifold and control valves from which hoses lead to mains along the sides of the drydock for connection with each of the dock pontoons. Controls are centralized at the manifold on the tender barge so that compressed air can be admitted to or released from groups of pontoons to cause the drydock to sink or rise uniformly and to trim it; thus any tendency to list by reason of unbalance of the load or otherwise can be corrected. When the drydock is submerged to the desired depth all valves are closed, back pressure in the pontoons prevents additional inflow of water and the level is maintained. The dock will take hulls that have drafts up to 10 ft.

When the hull to be lifted has been guided to proper location over the submerged dock, all of the compressors are started and the air supply valves are opened gradually until the dock rises sufficiently to begin to take the weight of the hull. During the raising of the dock, as additional air is admitted to the cells, care has to be taken to control the trim. The particularly critical time is at the instant the deck breaks water.

Instead of the fixed stabilizing towers ordinarily used on the sides of floating docks made with pontoon cells, it was necessary, on these small docks designed for use with seaplanes, to provide clearance between the plane wings and the tops of stabilizing towers. To meet this need the sleeve pontoon towers were built on the four corners of the dock, each made up of three cells; two attached

(Continued on page 161)

THERE'S BEEN A BIG CHANGE

★ It takes more than brawny backs and gravel-bed wagons to handle today's big excavating jobs. It takes modern heavy-duty equipment.

It takes heavy-duty bearings, too. And the Tyson "All-Rolls" Bearings fill the bill. Tyson has 30% more load-carrying rollers than ordinary tapered roller bearings. Extra rollers mean increased capacity . . . longer bearing life . . . less maintenance cost.

On rugged assignments, where long, hard service is daily routine—depend on Tyson.

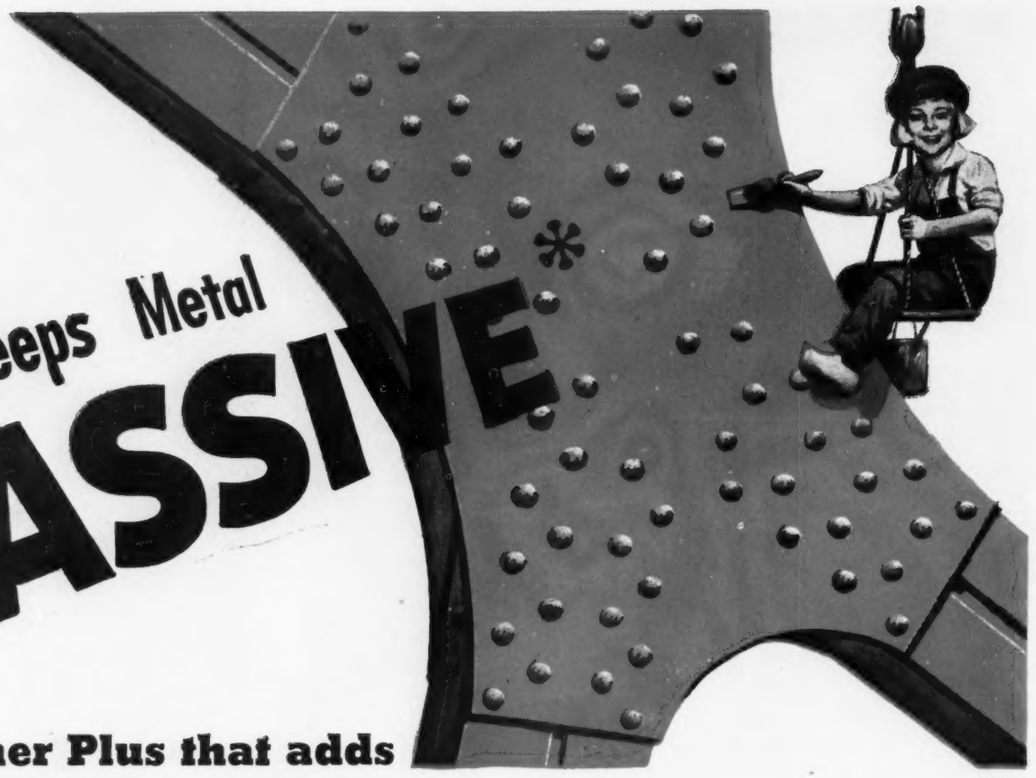
TYSON BEARING CORPORATION • MASSILLON, OHIO

COUNT THE ROLLS · THE ROLLS COUNT

Tyson

THE LAST WORD IN ANTI-FRICTIONEERING

★ BUY WAR BONDS FOR KEEPS ★



Keeps Metal PASSIVE

...another Plus that adds to RED LEAD'S Extra Rust Protection...

There is no question about Red Lead's acceptance throughout industry as the standard priming paint for *making metal LAST.*

One important reason is its ability to keep metal surfaces in a "passive" or rust-inhibiting state. Authorities agree that metal protective paint should be rust-inhibitive to give satisfactory performance.

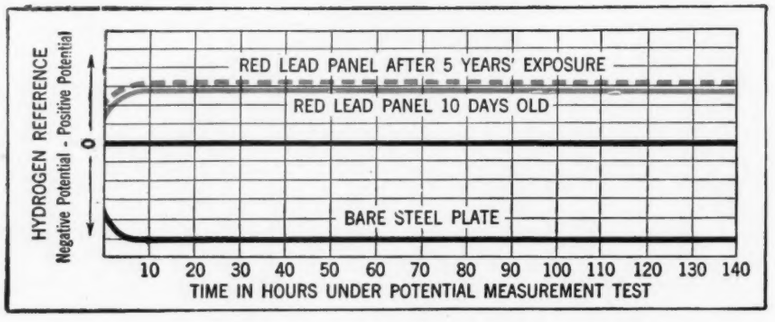
Time-potential curves, such as the one at right, are used to express rust-inhibitive properties of paint and thus indicate its effectiveness of protection. They show the effect of Red Lead on the potential of steel in the presence of moisture or water.

For example, a steel panel whose potential is *positive*, relative to hydrogen, is considered to be in a passive or non-corroding state. A negative potential indicates corrosion activity or rusting. The graph shows clearly the rust-inhibitive effect of Red Lead paint on steel as contrasted with the rapid and continuous rusting of unpainted steel.

Note that in this test a Red Lead paint film which had weathered 5 years was just as effective in preventing rust as one which had dried for only 10 days.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead.


HYDROGEN REFERENCE
Negative Potential - Positive Potential
0
RED LEAD PANEL AFTER 5 YEARS' EXPOSURE
RED LEAD PANEL 10 DAYS OLD
BARE STEEL PLATE
10 20 30 40 50 60 70 80 90 100 110 120 130 140
TIME IN HOURS UNDER POTENTIAL MEASUREMENT TEST

*Proof That Red Lead Keeps Metal Passive

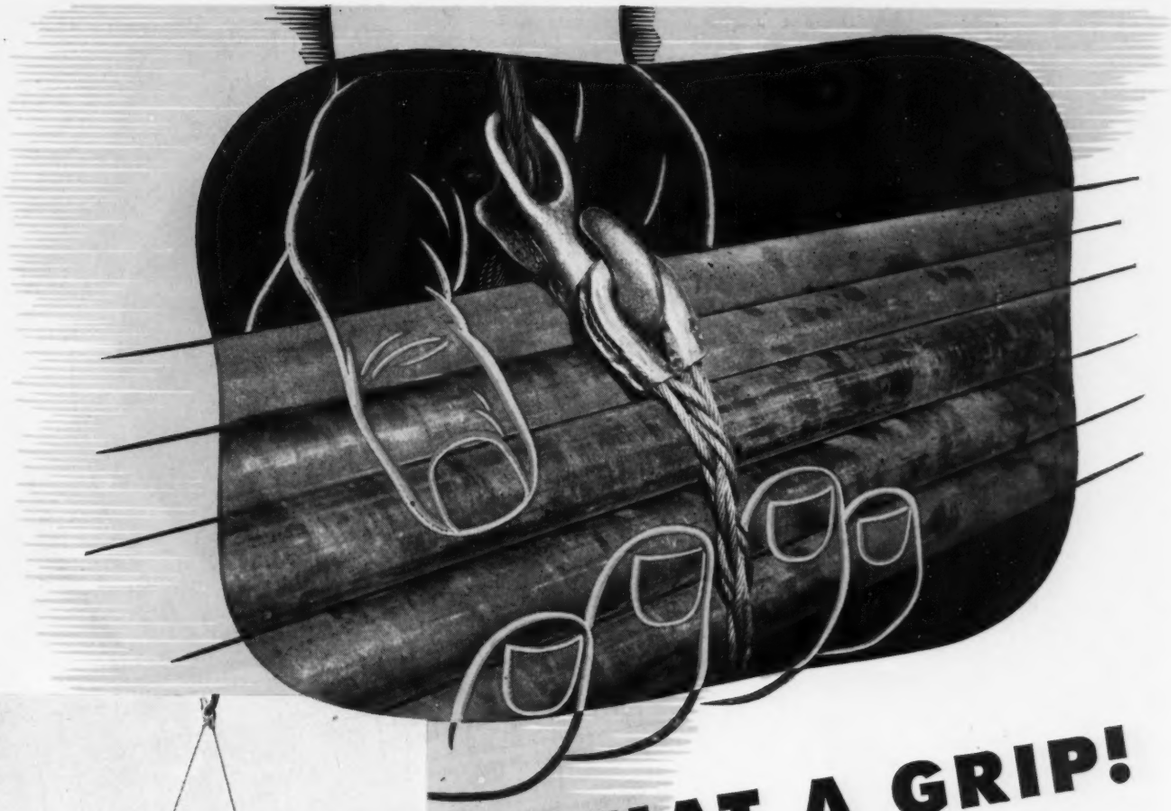
In the above test a piece of unpainted steel was immersed in water. Iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential (see above graph). However, when steel panels painted with Red Lead were immersed under the same conditions, ferric and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

Write for New Booklet—"*Red Lead in Corrosion Resistant Paints*" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas ... ranging from Red Lead–Linseed Oil paints to Red Lead–Mixed Pigment–Varnish types. If you haven't received your copy, address nearest branch listed at right.

All types of metal-protective paints are constantly being tested under all conditions at National Lead's many proving grounds. The benefit of our extensive experience with Red Lead paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston 25, W. Va. (Evans Lead Division).

DUTCH BOY RED LEAD



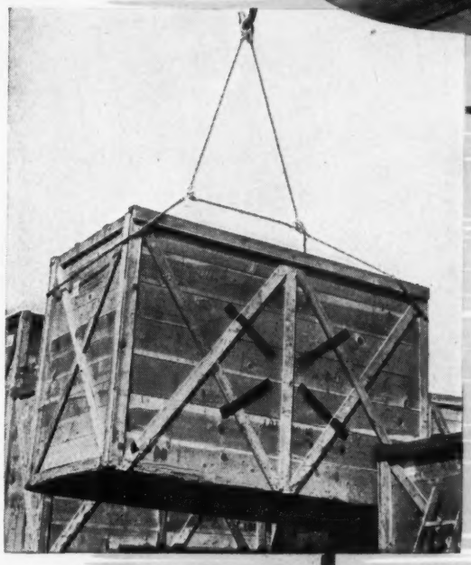
WHAT A GRIP!

Handle loads safely . . . economically with YELLOW STRAND *BRAIDED* SLINGS*

A lot of industries have taken a fresh hold on the sling question as a result of war production. And what a grip they get by using the adaptable Yellow Strand *Braided* Safety Sling! After handling just about every extreme in lifts — from multi-ton ship sections, tanks and guns to light-weight parts, jigs and crates — this improved type of sling is today primed to speed *your* assembly line, shop or field operations.

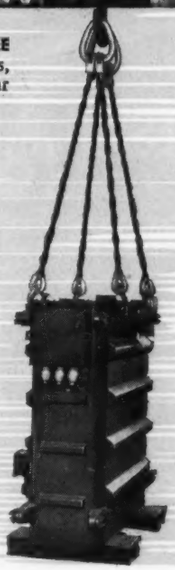
Tough Yellow Strand Wire Rope provides the sling's strength. The patented *braiding* adds flexibility, kink-resistance and a snug grasp on odd-shaped, rounded or slippery objects. The combined result is a time-and-labor-saving sling with less weight and bulk than chain of like capacity . . . with limberness well suited to former Manila rope jobs . . . with security that safeguards both employees and loads.

Properly fitted, Yellow Strand *Braided* Slings will give long-lived, economical service. Send details of your application now and let B&B engineers offer a recommendation. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.



RIGGERS' HAND BOOK FREE
Shows sling types, fittings, capacities. Write for your copy.

*PATENTS: U. S., 1475899, 1934671, 2142641, 2142642, 2299568; CANADIAN, 252874, 253068

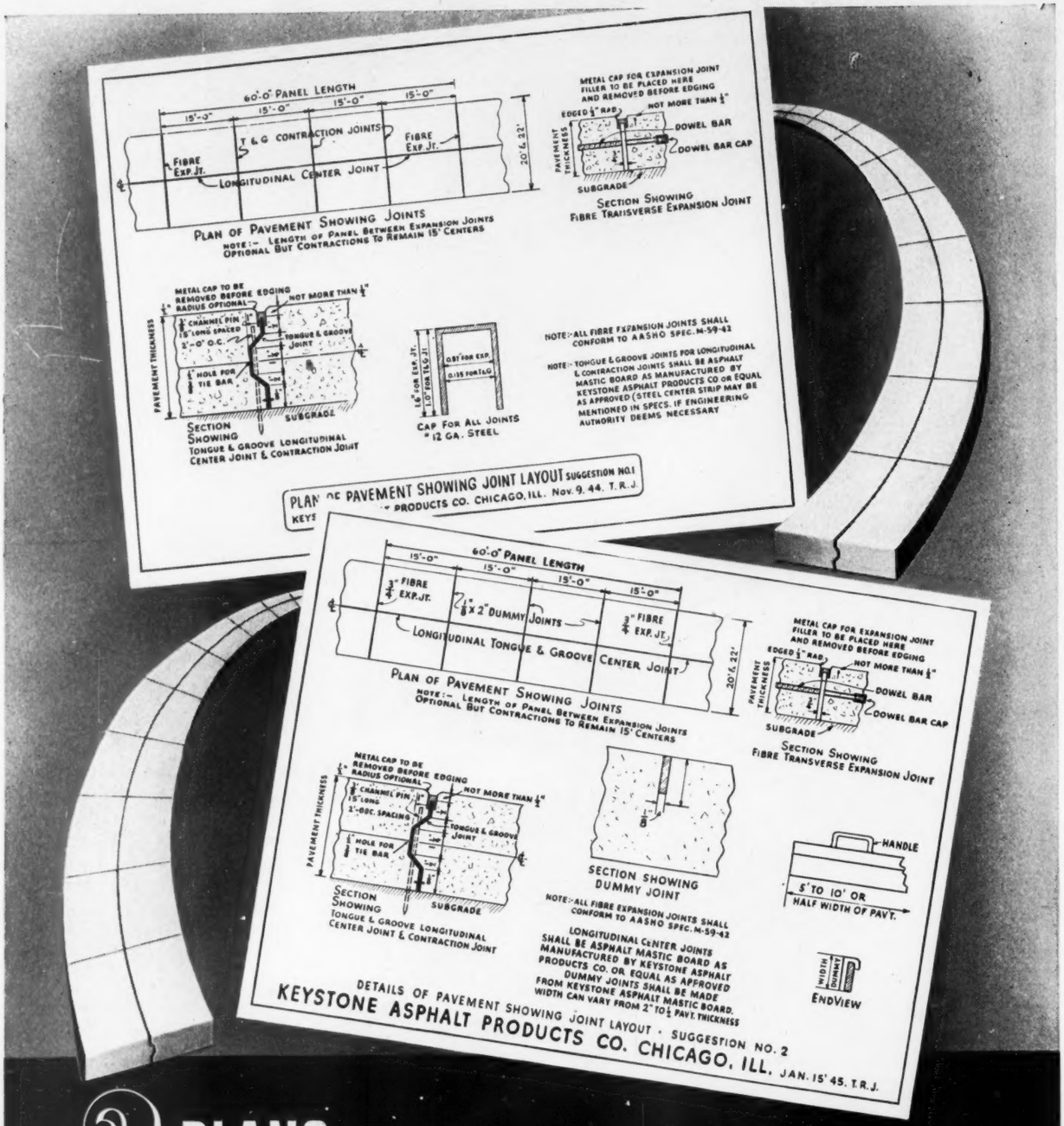


ARMY E NAVY

BRODERICK & BASCOM

Yellow Strand

BRAIDED SAFETY SLINGS

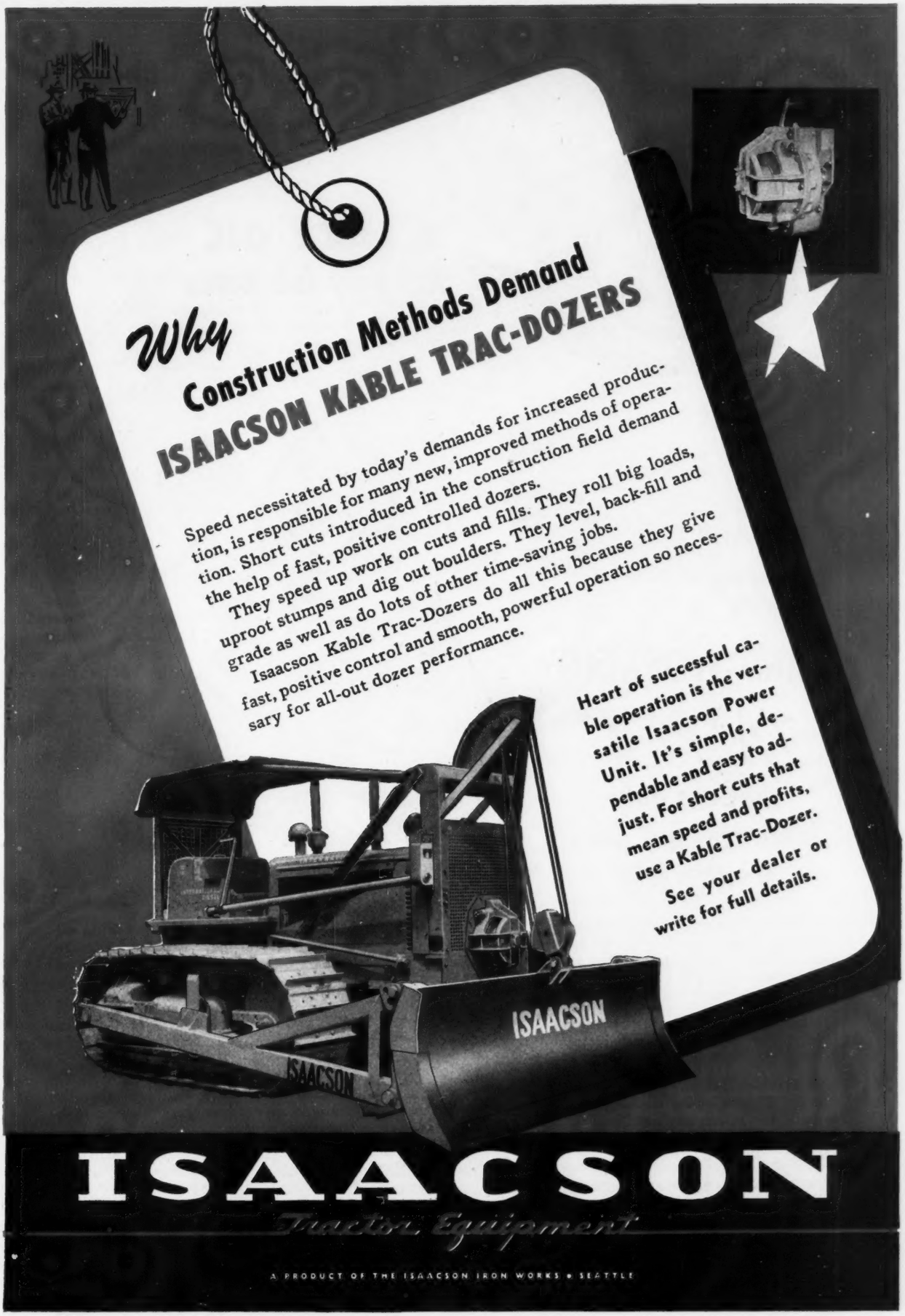

60'-0" PANEL LENGTH
15'-0"
15'-0"
15'-0"
15'-0"
T & G CONTRACTION JOINTS
FIBRE EXP. JT.
FIBRE EXP. JT.
LONGITUDINAL CENTER JOINT
20'6.22'
PLAN OF PAVEMENT SHOWING JOINTS
NOTE:- LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS
METAL CAP FOR EXPANSION JOINT FILLER TO BE PLACED HERE AND REMOVED BEFORE EDGING
EDGED 1/4" RAD.
NOT MORE THAN 1/4"
DOWEL BAR
DOWEL BAR CAP
PAVEMENT THICKNESS
SUBGRADE
SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT
METAL CAP TO BE REMOVED BEFORE EDGING RADIUS OPTIONAL
NOT MORE THAN 1/4"
1/2" CHANNEL PIN 15" LONG SPACED 2'-0" O.C.
TONGUE & GROOVE JOINT
1/4" HOLE FOR TIE BAR
SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT
0.07" FOR EXP.
0.135 FOR T&G
1.6" FOR EXP. JT.
1.0" FOR T&G JT.
CAP FOR ALL JOINTS
12 GA. STEEL
NOTE:- ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42
NOTE:- TONGUE & GROOVE JOINTS FOR LONGITUDINAL & CONTRACTION JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO OR EQUAL AS APPROVED (STEEL CENTER STRIP MAY BE MENTIONED IN SPECS. IF ENGINEERING AUTHORITY DEEMS NECESSARY
PLAN OF PAVEMENT SHOWING JOINT LAYOUT SUGGESTION NO.1
PRODUCTS CO. CHICAGO, ILL. Nov. 9. 44. T. R. J.
60'-0" PANEL LENGTH
15'-0"
15'-0"
15'-0"
15'-0"
3/4" FIBRE EXP. JT.
2" x 2" DUMMY JOINTS
3/4" FIBRE EXP. JT.
LONGITUDINAL TONGUE & GROOVE CENTER JOINT
20'6.22'
PLAN OF PAVEMENT SHOWING JOINTS
NOTE:- LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS
METAL CAP FOR EXPANSION JOINT FILLER TO BE PLACED HERE AND REMOVED BEFORE EDGING
EDGED 1/4" RAD.
NOT MORE THAN 1/4"
DOWEL BAR
DOWEL BAR CAP
PAVEMENT THICKNESS
SUBGRADE
SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT
METAL CAP TO BE REMOVED BEFORE EDGING RADIUS OPTIONAL
NOT MORE THAN 1/4"
1/2" CHANNEL PIN 15" LONG 2'-0" OC. SPACING
TONGUE & GROOVE JOINT
1/4" HOLE FOR TIE BAR
PAVEMENT THICKNESS
SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT
SECTION SHOWING DUMMY JOINT
HANDLE
5' TO 10' OR HALF WIDTH OF PAVT.
WIDTH DUMMY
ENDVIEW
NOTE:- ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42
LONGITUDINAL CENTER JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO. OR EQUAL AS APPROVED
DUMMY JOINTS SHALL BE MADE FROM KEYSTONE ASPHALT MASTIC BOARD. WIDTH CAN VARY FROM 2" TO 1/2 PAVT. THICKNESS
DETAILS OF PAVEMENT SHOWING JOINT LAYOUT · SUGGESTION NO. 2
KEYSTONE ASPHALT PRODUCTS CO. CHICAGO, ILL. JAN. 15' 45. T. R. J.

2 PLANS FOR MODERN JOINT DESIGN AND LAYOUT

These plans for modern highway design and construction, results of careful study of test and actual installations, carry out the thinking of forward looking highway engineers. Plan Number 1 shows Keystone Mastic Board Tongue and Groove Joint used as a longitudinal center strip as well as for transverse contraction joints—giving a maximum of load transmission between slabs. In Plan 2, Keystone Mastic Board Tongue and Groove Joint is used as center strip with Keystone Mastic Board Dummy Joint to create plane of weakness type contraction joints. FREE—Send for illustrated folder giving opinions of leading highway authorities as to the efficiency of Keystone's plans and designs for modern, concrete highway construction. It's full of valuable information on how Keystone can help you plan and produce better, longer-lasting concrete pavements. We'll also send complete blue-prints of the above plans and a catalog of Keystone "Road Tested" paving products.

KEYSTONE ASPHALT PRODUCTS CO.

43 E. OHIO STREET, CHICAGO 11, ILLINOIS • MANUFACTURING PLANT: CHICAGO HEIGHTS, ILLINOIS


Why
Construction Methods Demand
ISAACSON KABLE TRAC-DOZERS
Speed necessitated by today's demands for increased production, is responsible for many new, improved methods of operation. Short cuts introduced in the construction field demand the help of fast, positive controlled dozers.
They speed up work on cuts and fills. They roll big loads, uproot stumps and dig out boulders. They level, back-fill and grade as well as do lots of other time-saving jobs.
Isaacson Kable Trac-Dozers do all this because they give fast, positive control and smooth, powerful operation so necessary for all-out dozer performance.
Heart of successful cable operation is the versatile Isaacson Power Unit. It's simple, dependable and easy to adjust. For short cuts that mean speed and profits, use a Kable Trac-Dozer.
See your dealer or write for full details.
ISAACSON
ISAACSON
ISAACSON
Tractor Equipment
A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

What kind of *Oil* are your bearings being fed?

A LAZY OIL
that only lubricates

... OR

HARD-WORKING

TALPEX

that not only lubricates but does 4 extra jobs

1. Has high detergency. Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

2. Has exceptional Oxidation Stability. Holds to a minimum the formation of sludge, lacquer and other products of deterioration.

3. Has low Carbon-Forming Tendency. Reduces ring sticking and wear. Lengthens engine life.

4. Is non-corrosive to alloy bearings. Protects all lubricated engine parts against corrosion.

• You may think you've "hired" the hardest-working oil in the world to lubricate your engines. Then bang! You're in hot water. That's the trouble with a lazy oil. Its laziness shows up *after* you use it. Then the damage is done. To avoid engine troubles caused by an oil that does only one or two jobs in your engines, switch to hard-working Talpex. It not only does a good job of lubricating, it does all of the *4 extra* jobs that must be done if your engines are to be kept perking at their efficiency peak.

If the oil you now use is not doing all these jobs, it's lazy—should be changed to hard-working Talpex. Ask the Shell man to show you why.

Shell Oil Company, Inc., 50 West 50th Street, New York 20, N. Y.—100 Bush Street, San Francisco 6, Cal.

TALPEX

The All-Purpose, Heavy-Duty Lubricant
For trucks, buses, tractors, shovels, stationary and marine Diesels

SHELL

(Continued from page 154)

to the deck structure by bracket angles and struts as in other drydocks, the third, called the floating stabilizer or sleeve pontoon, arranged to slide up or down on pipe guides attached between the other two cells. With this arrangement the center cell moves upward as the drydock sinks, serving as a marker when submergence is greater than the height of the fixed cells and yet never projecting above the water surface by more than about 6 ft.

Air Compressor Plant

Usually these docks are made up with a deck or barge section six cells wide and twelve long. This gives a clear deck area of 43x70 ft. and the dock has a capacity of 150 tons. The air compressor plant provided on the tender barge may consist of either four compressors of the 100-cfm. 25-psi. type or two units each rated at 210 cfm. and 100 psi. In either case one of the compressors is a spare. In the pictures the compressor plant shown has four units from each of which a rubber hose 2 in. in diameter leads to the control valve manifold. Four hoses of the same size also lead from the manifold to cell groups in the dock itself. Scales or gage markings to show depth of submergence are painted on the fixed stabilizer cells as well as on the sliding cells in a position where they can be observed from the operator's station at the control valves.

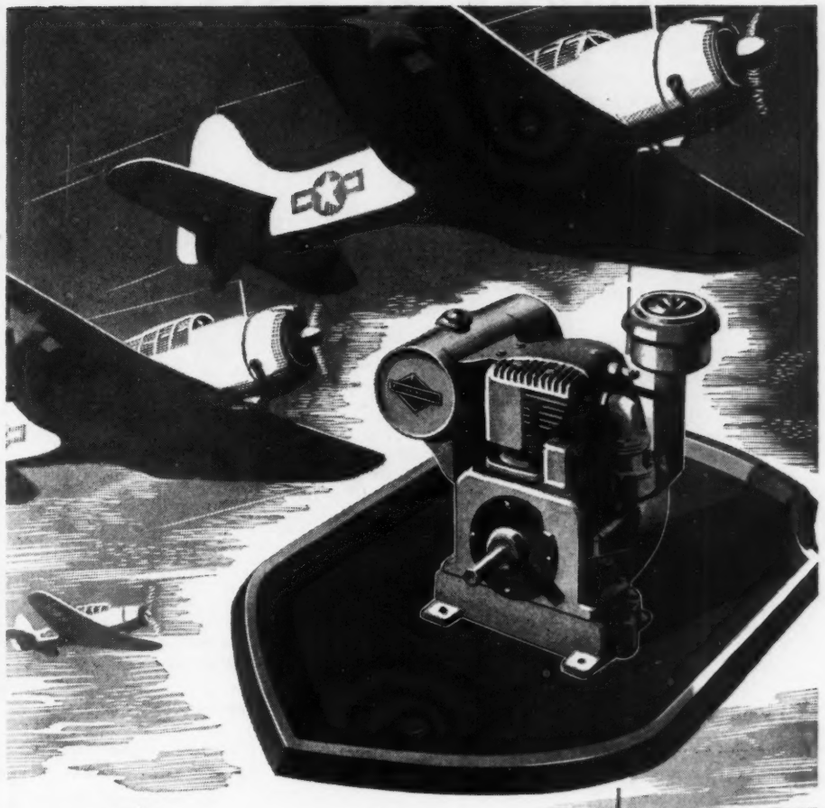
USE OF *Public Works*

(Continued from page 75)

for its appropriation committees, we would be better assured than we are at present that needs and costs and taxpayers' ability to pay were being given the consideration they deserve.

Several of the states, notably New York, Michigan and California, have made available state funds on a matching basis to encourage and assist local government agencies with the preparation of engineering and architectural plans for public works they intend to construct when materials and labor become available. Congress in its turn has made available funds which are advances to the states and communities for preparing plans now for needed public

(Continued on page 162)



Flying High!

AIRCRAFT ENGINES KEPT PURRING WITH *CLEAN* OIL

To keep fighters and bombers flying from far-flung bases the world over, the lubricating oil for aircraft engines is kept clean by frequent filtering with portable units powered by gasoline engines. One more of many standard and special applications for Briggs & Stratton 4-cycle *air-cooled* gasoline engines.

Everywhere they continue to establish new performance records—adding to their reputation as the world's finest small air-cooled engines—forcasting greater utility than ever before on a steadily increasing number of gasoline-powered appliances and equipment.

Air-Cooled Power 4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

Briggs & Stratton leadership in design, engineering and precision manufacture is the result of a quarter-century of *continuous* production of *"air-cooled power."* Manufacturers and users of all types of equipment requiring dependable, compact gasoline powered units will find it profitable to call for this experience to help them solve their power problems.

BRIGGS & STRATTON CORPORATION, Milwaukee 1, Wis., U.S.A.

SYMBOL OF SAFETY

Be safe in buying a pump by choosing one with the AGC rating plate. It is your assurance of better pumping—a guarantee that the pump will deliver full rated capacity.

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C. H. & E. MANUFACTURING CO. Milwaukee, Wis.
CONSTRUCTION MACHINERY CO. Waterloo, Iowa
MARLOW PUMPS Ridgewood, N. J.
Affiliated with
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.
STERLING MACHINERY CORP. Kansas City, Mo.
CARVER PUMP CO. Muscatine, Iowa
THE GORMAN-RUPP CO. Mansfield, Ohio
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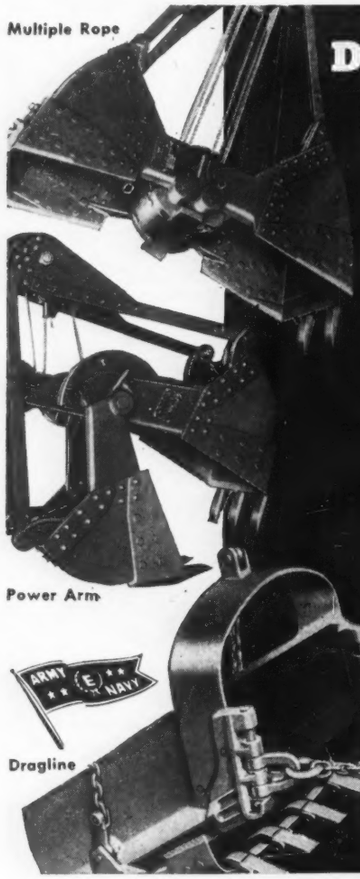

DO IT *Better-Faster!*

WELLMAN

Williams BUCKETS

You get better performance . . . more dependable performance from Wellman buckets —they're welded rolled steel construction . . . Sturdier, less breakage.

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THE WELLMAN ENGINEERING CO.
7017 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

(Continued from page 161)

works. These advances will be repaid when the actual construction goes forward.

One practical reason for the provision of these federal and state funds is that many local government agencies would otherwise have to wait for funds to prepare plans until proposed projects have been authorized and their entire financing, including cost of plan preparation and construction, had been arranged. Both the states and the federal government want these funds to encourage the development of a reserve of needed public works ready to be constructed. The Federal Works Agency is responsible for administering this activity as far as the federal government is concerned. The cooperative basis of the contacts it establishes with the states and communities is highly important. It can well serve as a pattern for any further activities which Congress decides are desirable.

Long-term Aim

The long-term aim should be to develop procedure, through team-work on the part of the federal, state and local governmental agencies, which will create the maximum flexibility in scheduling public works construction. If this can be accomplished, then we may hope that policies will be adopted which will overcome the past practice of public agencies pressing forward with their work when the facilities of the construction industry are being used to capacity and withdrawing from the market at the very time private work is falling off. Some intermediate course between these two extremes will result in maximum benefit to the construction segment of the economy, and hence will also serve the best interests of the government and the public.

There are two courses to follow in working out the relations of the construction industry, and of the states and communities, to the federal government in efforts to bring about a better sustained volume of construction activity. We must choose between them.

One is for the federal government to do the planning and for the private concerns and for the states and communities to be induced to fit their plans into the overall plan. The other is for the private concerns and for the states and communities to do the planning, and for the federal government to lend its encouragement and assistance.

We should follow the latter course. It fits into our well established concepts of the proper relations of government to business and of the federal government to the states and communities. It will get the best results over the long pull.

CONCRETE FACTS

about "Cushioned Air" Paving Breakers

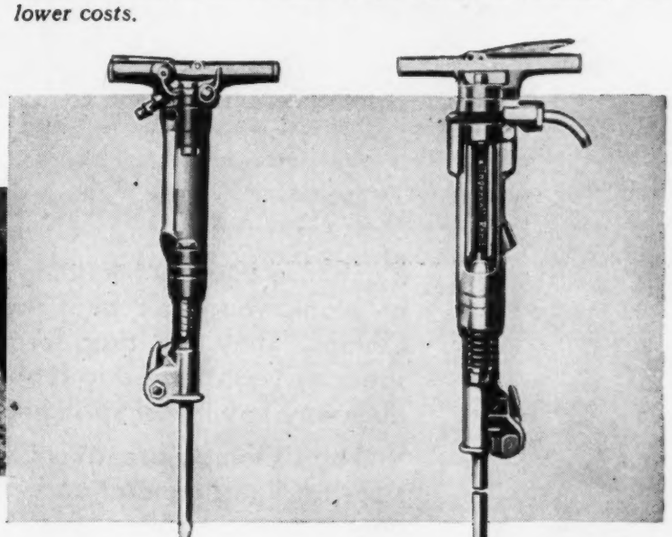
CC-60 and CC-80

POWER — The "Cushioned Air" principle absorbs the blow of the piston when the steel is not in contact with the work. Since the fronthead and parts do not take any of the shock of the piston blow, more power can be packed into these machines. Other advantages are:

LOW UPKEEP COSTS—When "Cushioned-Air" Paving Breakers are used, only the work and not the fronthead parts receives the full force of the piston blow. Breakage from the impact of such blows is eliminated.

EASIER HOLDING — "Cushioned-Air" does away with the shock which would otherwise be transmitted to the operator's hands and arms. This easy holding feature is of special advantage when working with high air pressures. Combine easy holding with the hard-hitting ability and low upkeep of these tools and the result is *more work done, less trouble, and lower costs.*

"Cushioned-Air" Paving Breakers are ideal for street repair and gas, water and sewer main and factory maintenance. The CC-80 shown above is breaking out an old pump foundation for refinery expansion.



"Cushioned-Air" Paving Breakers are available in two sizes — the 60-lb-class CC-60 is ideal for breaking brick and concrete, walls and floors where it is not feasible to use a heavier tool. The 80-lb-class CC-80 is widely used in contracting, quarrying, maintenance and demolition work. Pile driving frontheads for 2, 2½, and 3" wooden sheet piling are also available with this machine.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

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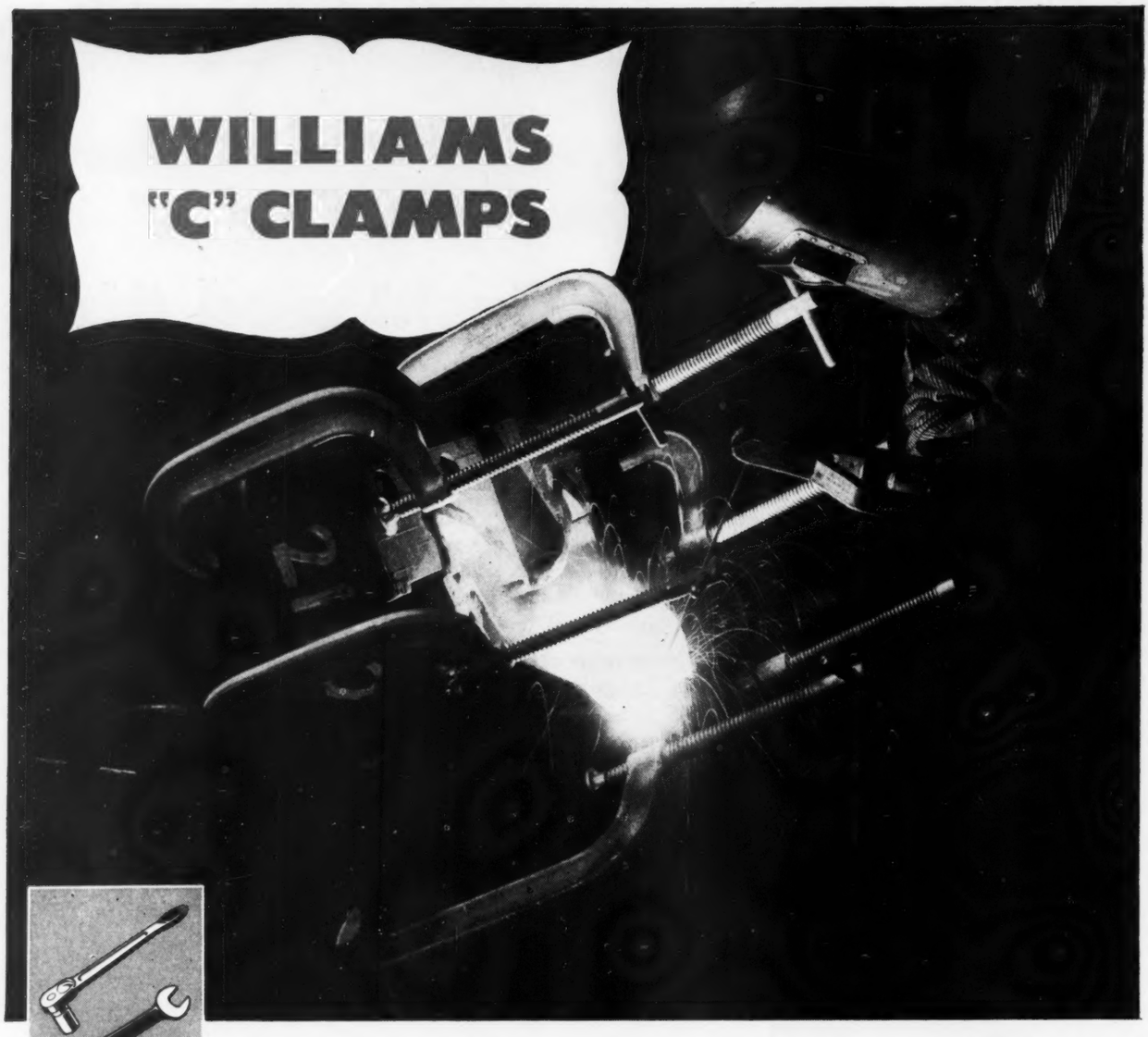
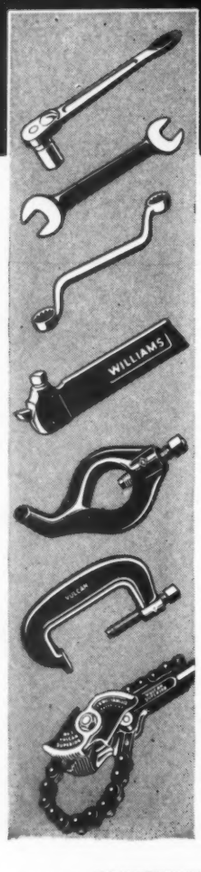
COMPRESSORS • TURBO BLOWERS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES • CONDENSERS •

WILLIAMS "C" CLAMPS





for Positive Holding Power

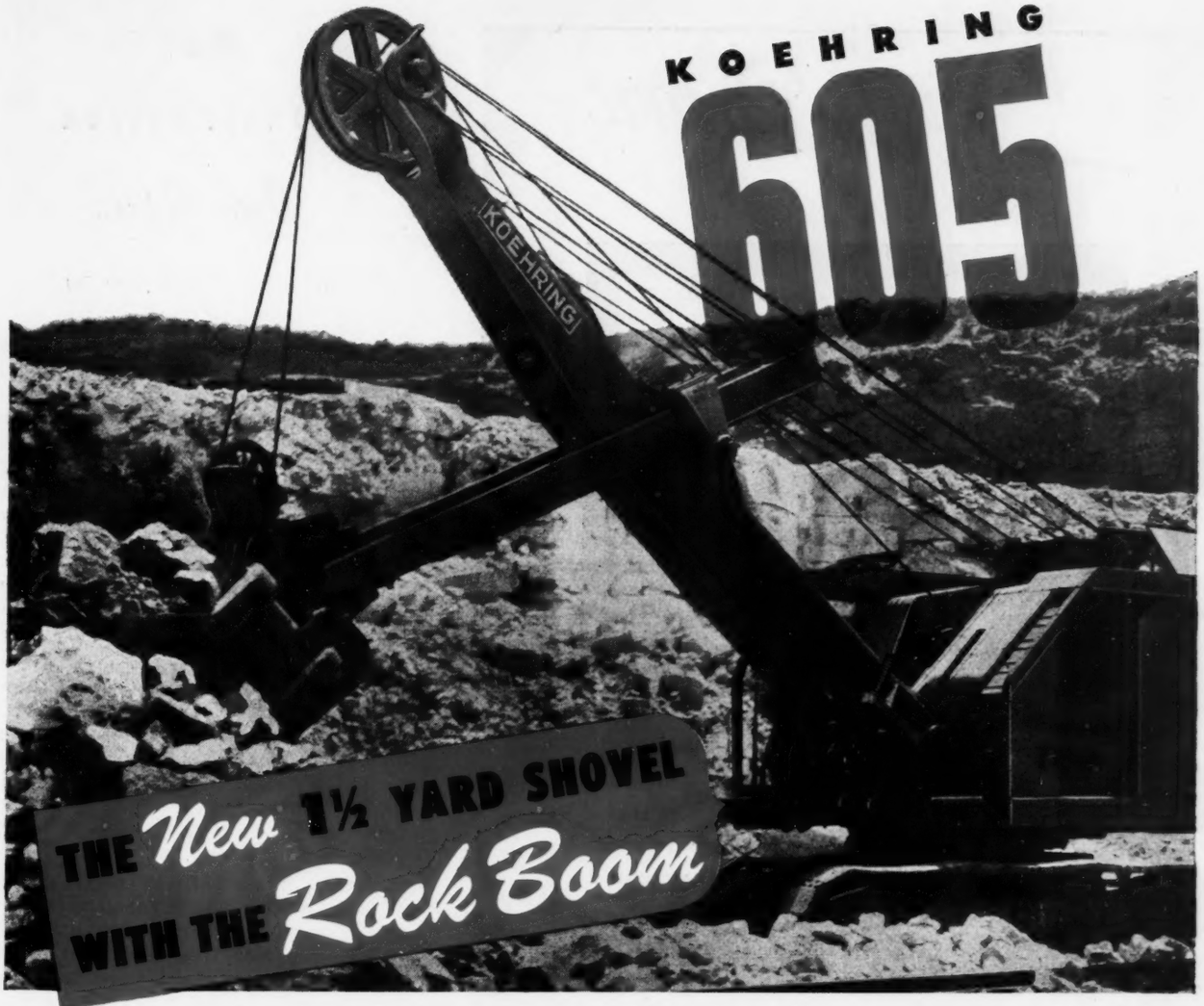
For those countless *holding* jobs daily encountered in shop or plant, you can't beat the slip-proof grip of Williams "C" Clamps. They are *drop-forged* from tough, selected steel—specially heat-treated to further increase their strength and reduce any liability of springing.

Williams Clamps are available in a variety of patterns and sizes for light, general and heavy duty. The clamps illustrated have a special spatter-resisting finish for welding service. All screws are hardened, tempered and threaded U.S. Standard. Sold by Industrial Distributors everywhere. J.H. Williams & Co., Buffalo 7, N.Y.

WILLIAMS
DROP-FORGINGS AND DROP-FORGED TOOLS

KOEHRING

605



THE New 1½ YARD SHOVEL WITH THE Rock Boom

Designed for Tough Rock Digging. Heavy welded box boom. Boom-foot shock absorber takes out lateral twisting strains. Larger shipper-shaft sprocket gets more push into crowd action. Chain drive tightened by power. Three-foot boom point sheaves go easy on hoist cables. Straight, simple shipper shaft comes out easily. No boom weakness below shipper shaft because shipper shaft is set into upper edge of boom, not through center.

These base machine advantages, too, add up to better rock performance: Separate crawler frames provide the flexibility needed for tough digging. Adjustable hook rollers make possible the fine adjustment that eliminates tipping. Power clutch, set by 15-pound pull, retains "feel" of load. Straight splined shafting, not weakened by shoulders and keyways, adds digging strength.

KOEHRING COMPANY, Milwaukee 10, Wis.

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PLEASE SEND NEW 605 EXCAVATOR CATALOG TO:

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HEAVY-DUTY CONSTRUCTION EQUIPMENT

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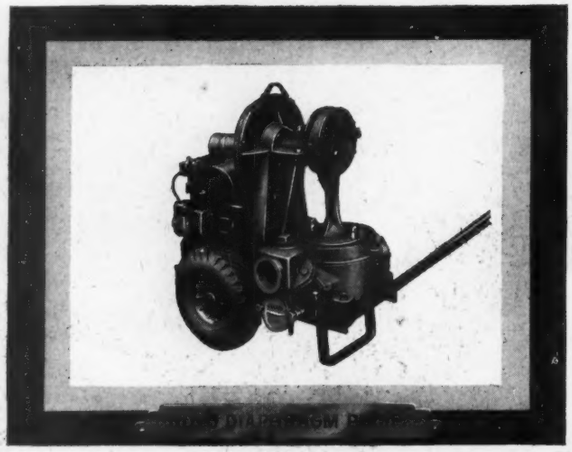


Diaphragm Pumps are definitely in the picture for postwar construction! They are designed and built to handle water that is laden with mud — sludge — sand — gravel — and other debris!

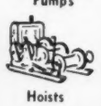
Novo Diaphragm Pumps feature the ECCENTRIC DRIVE instead of the old-fashioned walking beam. This eccentric drive means fewer moving parts — shorter over-all length — less dead weight! When the going is heavy — the Novo Diaphragm Pump is a real "mudder!"

To get the true picture of the Novo Diaphragm Pump, consult your Novo Distributor, or write for Bulletin No. 167-C!

Your Novo Distributor will be happy to help you with your equipment questions.

Allied Member of A.E.D.

Self Priming Pumps


Hoists

Engines

Diaphragm and Pressure Pumps

NOVO ENGINE CO.

LANSING 5, MICHIGAN

War Construction *In Asia*

(Continued from page 68)

kyina airfield on the day of its capture. The first contingent arrived in gliders; others were able to get in by plane that night, and helped clean up the last pockets of Jap resistance with hand grenades. Then came the task of making the strip usable, meanwhile dragging out of the way planes that ran into trouble as they hit soft spots in the runway and shoulders.

Colonel Manuel J. Asensio and his Aviation Engineers at first had only the light airborne equipment to work with. They used this surprisingly well, paying much attention to drainage. This precaution helped the airfield to stand up through some severe monsoon storms. One night a 5.6-in. rain occurred, accompanied by high winds which tore the camp to pieces, but did not prevent the well-drained runway from receiving 109 planes the next day.

Myitkyina airfield was indeed subjected to heavy traffic and constant use from the beginning. In no other way could the ground forces be supported, for the head of the Ledo Road, itself beset with monsoon difficulties, was many miles in the rear. Meanwhile as the engineers worked on the airfield they were subjected to frequent shellings from Jap artillery in the nearby town, in addition to raids from Jap planes.

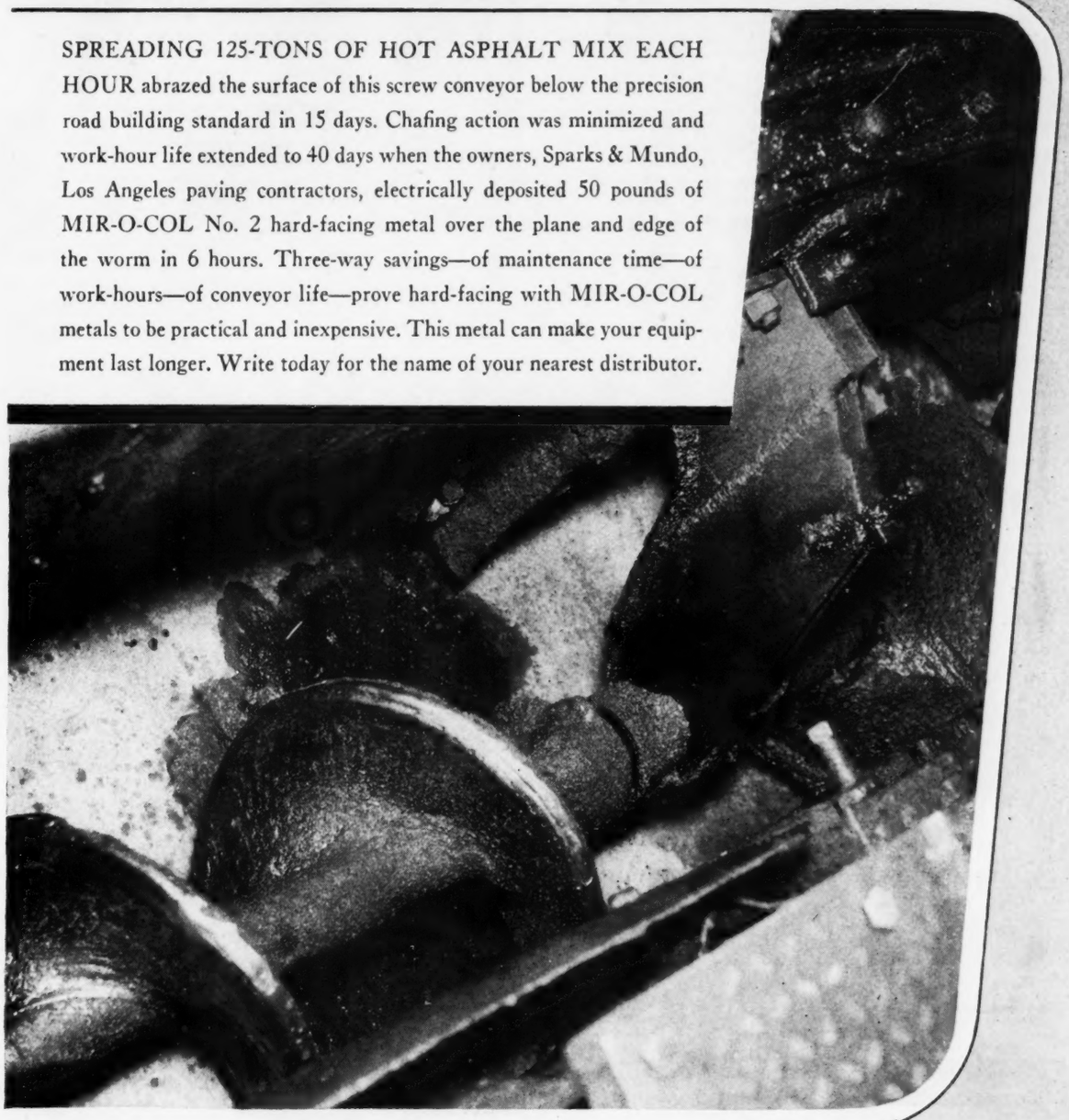
Heavy Equipment Transported by Air

Better days were coming for the engineers. Heavy equipment and plenty of it was available back in Assam (northeast India), and additional engineer aviation battalions were successively made available. This meant a unique task in transporting heavy equipment. Reports were available on the technique of disassembling equipment for air transport, and here and there equipment had been thus transported, but never on the present scale. In the course of the next few weeks, for example, 48 D7 tractor bulldozer outfits were disassembled, flown into Myitkyina, and there reassembled. Each bulldozer called for half a dozen plane loads. The 8-yd. scraper required cutting by acetylene torch into no less than 17 parts, to be rewelded later on the site. Transfer of this heavy equipment proceeded smoothly and became a

(Continued on page 170)

Hard-Faced FOR A TOUGH JOB

SPREADING 125-TONS OF HOT ASPHALT MIX EACH HOUR abrazed the surface of this screw conveyor below the precision road building standard in 15 days. Chafing action was minimized and work-hour life extended to 40 days when the owners, Sparks & Mundo, Los Angeles paving contractors, electrically deposited 50 pounds of MIR-O-COL No. 2 hard-facing metal over the plane and edge of the worm in 6 hours. Three-way savings—of maintenance time—of work-hours—of conveyor life—prove hard-facing with MIR-O-COL metals to be practical and inexpensive. This metal can make your equipment last longer. Write today for the name of your nearest distributor.



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TO SECURE YOUR FREE COPY of the "Weldor's Guide to Successful Hard-Facing," write to MIR-O-COL ALLOY Company. Give your home address if you wish to be put on the MIR-O-COL News monthly mailing list.

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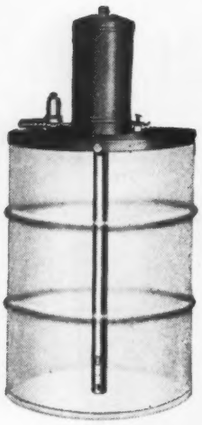
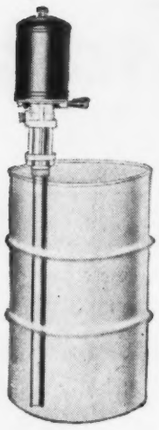


ALEMITE

No. 7701-B

Heavy Duty Barrel Pump

This pump can save you time and machines because it delivers fibrous, heavy or light lubricants direct from "barrel to bearing." Under the severest conditions, the performance of this ruggedly built pump is *guaranteed*. The exclusive Dyn-a-Matic Primer permits pumping of heavy fibrous lubricants even at low temperatures. What's more, the pump has the capacity to serve many outlets at the same time. It is made in high, low and medium pressure models. Suitable for lubrication of tractor rolls, idler bearings and all pressure gun fittings.



ALEMITE

No. 7710

Fast Delivery Oil Power Pump

A ruggedly built, heavy duty oil pump which pumps oil directly from 55-gal. drums. Used for rapid filling of crank cases or other housings requiring oil or fluid gear lubricants. To operate, simply connect air line to easily detachable air coupling. This pump can make big savings for you wherever a large volume of oil or fluid lubricant must be transferred quickly. It delivers 3½ gal., of S.A.E. No. 10 oil per minute using 100 lb. air pressure, developing 4½ times air pressure used. In every way, this is a fast, accurate dependable pump.

HERE'S NEW ALEMITE EQUIPMENT

to Replace Broken and Inadequate Pumps

WHERE you can, put old lubricating equipment back in service by replacing worn parts with genuine Alemite parts. But you'll save time and money by replacing broken down, worn out equipment with new Alemite equipment. With machines depending for their lives on proper lubrication, you can't take a chance on breakdowns. Look over your lubricating equipment now, and then talk with your jobber.

ALEMITE

First in Modern Lubrication

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EQUIPMENT • LUBRICANTS • MAINTENANCE • CONSULTATION • ENGINEERING

Another Product of STEWART WARNER

ALEMITE

No. 6679

High Pressure Volume Delivery Gun

Here is a really heavy-duty gun that can take abuse and still do a dependable lubrication job. Has 21-oz. capacity and will handle fibrous, heavy and light-bodied greases. The gun develops up to 5000 pounds pressure per sq. in. It is easily and quickly filled through a loader valve or by removing the cylinder head. It is spring primed. The extra long handle gives maximum leverage and operating ease. Used with hose or adapters for lubricating all kinds of pressure fittings.

ALEMITE

No. 6528

40-lb. Pneumatic Gun

The famous Alemite "rock crusher." A sturdy, hard-hitting heavy duty gun with amazing versatility. Operates on 90 to 150 lbs. air pressure. Handles heavy greases at 33 times pressure used. Exclusive helix arm and worm action assures positive priming and eliminates air pockets. Has three large wheels which facilitate moving about on rough floors. Comes with 10-ft. high pressure hose, control valve with hydraulic coupling and adapters for Pin Type and Push Type fittings.

POWER for Great Projects

PLAN *Now* FOR POWER FOR PEACETIME CONSTRUCTION

INTERNATIONAL HARVESTER

Great construction projects await final victory. There are airports, state and federal highways, bridges, dams to build. There are vast flood control, land clearing, and housing plans to be activated. All will require power of the kind that has made the name International famous.

Think now of International Power—TracTracTors, Wheel Tractors, and Power Units—in relation to your postwar plans. These tractors and power units, designed and built by International Harvester, come with both Diesel and carburetor-type engines and in sizes adapting them to a multiplicity of jobs. Into their design and construction goes the know-how that has made International Harvester the world's leading tractor producer.

Although civilian supplies are limited, *now* is the time to plan your postwar power set-up. Let the International Industrial Power distributor help you. He has the power that will be most useful and economical for you. And his service facilities are tops!

INTERNATIONAL HARVESTER COMPANY
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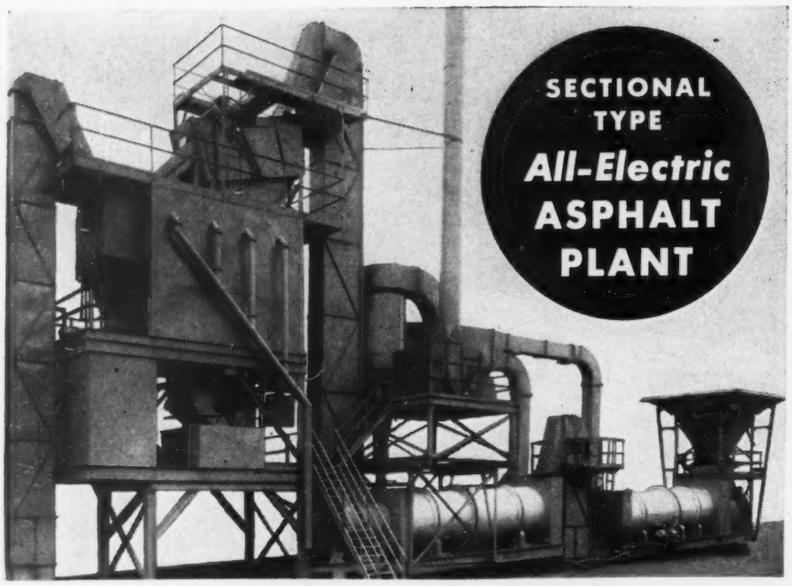
INTERNATIONAL POWER



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This sectional type H & B asphalt plant is completely electrical in operation, with all units driven by individual motors—no chains or countershafts. All units are wired completely at our factory. Once the plant is assembled you are ready to hook up to the power line and start operating. The plant is quickly assembled and disassembled, and easily portable. Refinements in design include a larger fan, new horizontal cyclone dust collector and new type screen, making for greater compactness and increased efficiency. Write for complete information.

H & B — ESTABLISHED 1867

HETHERINGTON & BERNER INC.
735 Kentucky Avenue **Indianapolis 7, Indiana**

SUPER-PERFORMANCE

Like that of the B-29, Owen superiority is based upon a thorough knowledge of the problem, expert designing and precision manufacturing from the most appropriate materials available

The OWEN BUCKET Co.
6020 Breakwater Avenue, Cleveland, Ohio
Branches: New York Philadelphia Chicago Berkeley, Cal.

OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

(Continued from page 166)

routine matter. Something like 1,500 plane loads were required for movement of troops and equipment, and this movement was accomplished without the loss of a single major piece of equipment. The planes employed were for the most part C-47's, although the occasional use of a C-46, with its greater weight-carrying capacity and larger door, was advantageous.

The town of Myitkyina fell to Stilwell's army during August of 1944, and Myitkyina eventually became a rear area as the war moved on to the vicinity of Bhamo and farther south. More and more all-weather airfields were built for the 10th Air Force in support of the Northern Combat Area Command, together with a score of fair-weather airfields for temporary use. The latter were often started at forward locations before the Japs were out of gun range. These fair-weather fields are readily prepared in dry weather, but are totally unsuitable for use during the monsoons. The all-weather airfields on the contrary provide more permanent bases with well-graveled runways, taxiways and parking aprons. For these fields it is advantageous to provide a surface treatment of asphalt, both for the sake of durability and of dust prevention. Asphalt treatment has been the final step in the preparation of these airfields, which have a continuing importance in view of their situation on the route to China.

Airlift vs Truck Haul

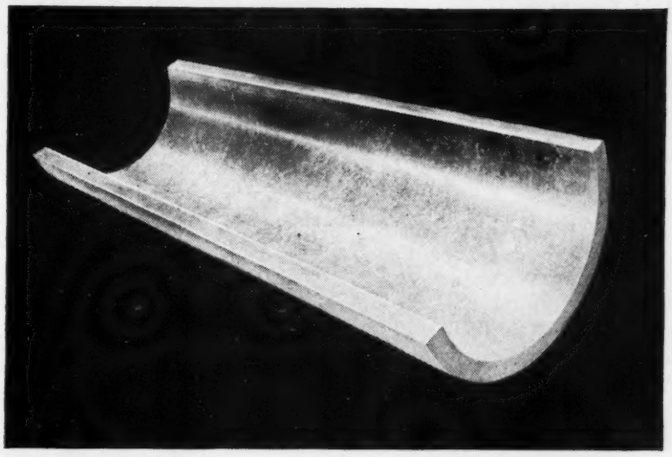
In all these operations in Northern Burma I have been greatly impressed with the flexibility and efficacy of air transport. Here it has been uniquely demonstrated that entire armies can be supplied by air for months at a time, independent of ground channels. Thus for 6 months, from mid-May till mid-November, when the first convoy over the Ledo Road arrived at Myitkyina, the ground forces there and further south were entirely dependent on air supply. In the past we have thought of air transport as a relatively expensive method. At Myitkyina it was the sole means of transport available, but moreover it has been demonstrated that in traversing jungle-covered, rugged terrain air transport has advantages over roads in many ways. Under such conditions one C-47 plane can do the work of perhaps a score of trucks. The men required to operate and maintain the plane are far less than for a comparable number of trucks. The manpower required to build and maintain the airfields is immeasurably less than that required to carve out and maintain a virgin road through such country. Certainly supply by plane is more flexible and speedy and (in this theater at

(Continued on page 172)

You save on all 3 counts!

low installation costs

In every phase of pipe installation—including handling and assembly—you save with Transite! You save because this light weight pipe requires smaller installation crews . . . needs no mechanical handling equipment except for the larger sizes. Rapid assembly is assured with the Simplex Coupling.



low operating costs

Because of Transite's asbestos-cement composition, its initial high delivery capacity (C-140) can never be reduced by tuberculation. Pumping costs stay low. This advantage often permits use of smaller diameter pipe . . . and ends problems arising from progressive reduction of carrying capacity due to tuberculation.

low maintenance costs

In modern water systems, Transite Pipe provides another important money-saving advantage—low maintenance. Even in highly aggressive soils, it stubbornly resists corrosion. And because Transite cannot tuberculate, the need for periodic cleaning is eliminated—another appreciable maintenance saving.

Booklet TR-11A gives all the facts. Write Johns-Manville, 22 East 40th Street, New York 16, N. Y.

Johns-Manville

TRANSITE PIPE
for efficient, economical water transportation

SAVINGS IN TIME AND EFFORT WHEN DRIVING THOSE PILES

SUPER-VULCAN OPEN TYPE DIFFERENTIAL-ACTING PILE HAMMERS

18C, 30C, 50C and 80C

★ The hard-hitting blows of a SUPER-VULCAN insures speed records for the most extensive pile driving jobs in any part of the country. Along with it go low costs because of time savings and ability of the SUPER-VULCAN to stay on the job.

You get twice the blows per minute—that's where a big saving in time and effort begins. Remember your SUPER - VULCAN uses 25% to 35% less steam per blow.

Be prepared for these new construction pile driving jobs—do them at less cost — faster — easier.

The SUPER-VULCAN Open-Type fits same leaders—uses same accessories as VULCAN Single-Acting Pile Hammers.

Sizes
18C—30C—50C—80C
meet all needs

VULCAN IRON Since 1852 WORKS
331 North Bell Avenue
Chicago 12 ---Illinois

(Continued from page 170)

least) has proved less subject to interruption by weather.

The extent of the effort required to supply not only the Northern Combat Area Command, but also the 14th British Army's advance on Mandalay and Rangoon, can be understood from the following figures. During March, 1945, transports of General Stratemeyer's Eastern Air Command flew into Burma 98,000 tons of food, ammunition and other cargo, including troops and animals. If considered in terms of 30-ton freight cars, 35 to a train, this is equivalent to three train loads a day. This does not include the amount of tonnage flown over the Hump to China, close to another 50,000 tons. It is evident that this airlift has been the life-line of the campaign in Burma as well as support to China. And in building the airfields required for transport as well as combat planes, the Aviation Engineers have responded enthusiastically and effectively.

Asia's Future

In closing, it is interesting to speculate on the future of Asia, a country where the military, political and economic considerations all involve a big question mark. Inevitably there will be an increasing flow to Asia of western ideas, western engineers and western implements. This flow is being quickened by the war. More and more young men from India and China seek admission to our colleges. Surely America will be prepared to play its part in helping to establish for these teeming millions a higher standard of living.

★ ★ ★

Captured Nazi War Goods

(Continued from page 61)

steel, estimated at several million tons, have been uncovered.

Much of the goods captured in the Saar sector was packed in box cars and ready to be moved when found. In one small area more than 4,500 railway cars were loaded with more than 35,000 tons of various materials. Critical supplies were hooked on to locomotives, manned by German railway men for delivery to the Seventh Army. Less needed war ma-

(Continued on page 174)

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This book is carefully planned to give the information needed by men who actually plan, select, design, and construct civil engineering structures and projects—in one compact volume and at a reasonable price. This edition blends theory, practice and fundamentals equally; and answers your questions in *any* division of civil engineering.

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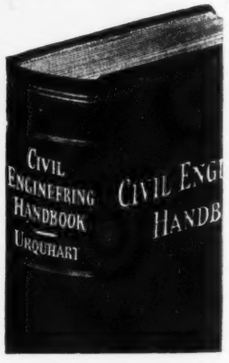

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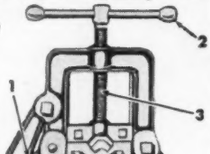

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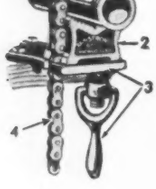

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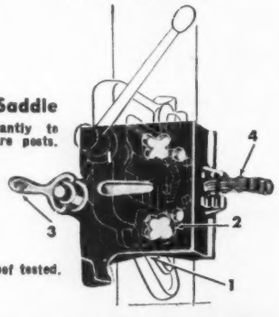

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(Continued from page 172)

terials were taken to one of three huge collecting points where they are stored for future use, and cars bearing civilian goods, such as food, clothing or housing materials, were railed back to France and Belgium.

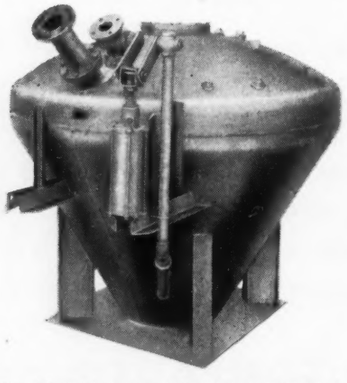
German War Materials

Lt. Col. Charles C. Redman, Jr., is commanding officer of the Engineer units engaged in the work in the Saar Valley. "We have uncovered enough material practically to live off the land," said the colonel. "The Germans could have carried on the war indefinitely with the equipment and manufacturing facilities we have found in the Saar Valley. It is apparent that every German home, garage and barn was a potential warehouse or war factory. Huge quantities of materials have been uncovered in the basements of private homes and complete factories tooled to turn out munitions, arms, and vehicle parts have been found in isolated livestock barns.

"I was amazed at the tremendous amount of steel the Germans had stockpiled in this area. This steel, along with the huge supplies of lumber, cement and other building materials we have found, makes it apparent that the Germans have

(Continued on page 180)

Move Cement by Air-Floating It!



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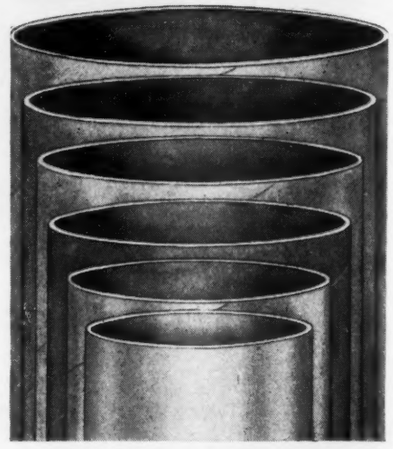

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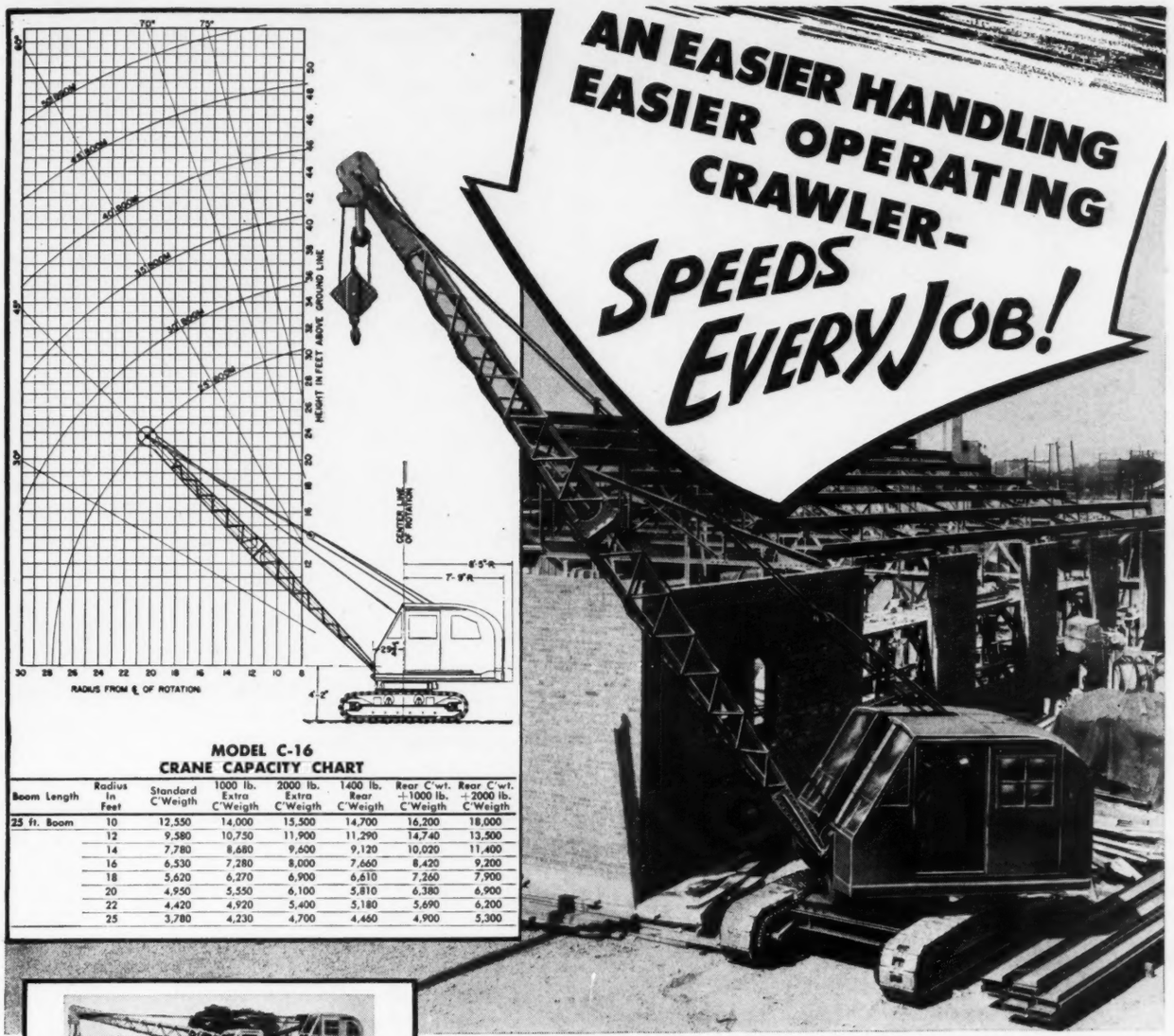

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25 ft. Boom	10	12,550	14,000	15,500	14,700	16,200	18,000
	12	9,580	10,750	11,900	11,290	14,740	13,500
	14	7,780	8,680	9,600	9,120	10,020	11,400
	16	6,530	7,280	8,000	7,660	8,420	9,200
	18	5,620	6,270	6,900	6,610	7,260	7,900
	20	4,950	5,550	6,100	5,810	6,380	6,900
	22	4,420	4,920	5,400	5,180	5,690	6,200
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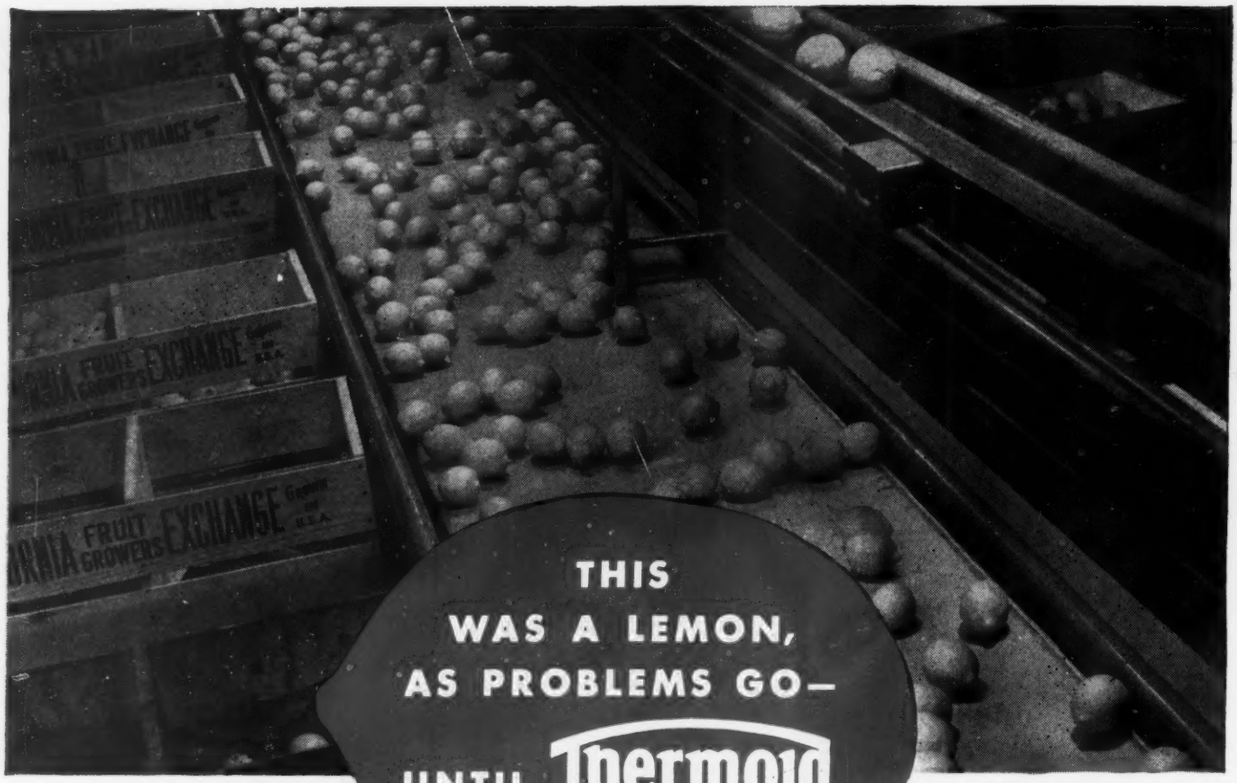

THIS WAS A LEMON, AS PROBLEMS GO— UNTIL Thermoid SOLVED IT!

While studying the citrus fruit packing industry, Dr. McClelland discovered that lemon sorters and graders were suffering unusual eye fatigue, which could be corrected by using grading belts of a special color. Dr. McClelland then specified a color which would give sufficient contrast to the color of the fruit for efficient sorting and yet provide a softer background, restful to the eyes of the graders.

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Thermoid is the only company licensed to manufacture Dr. McClelland's "Easy on the Eyes" Conveyor Belting. When war time restrictions are lifted, Thermoid will manufacture more of this belting.

This example of problem-solving ability was taken from our files to demonstrate that Thermoid engineering, research and manufacturing facilities—and the services of Thermoid's field representatives—are at your disposal in the solution of *your* industrial rubber problems.

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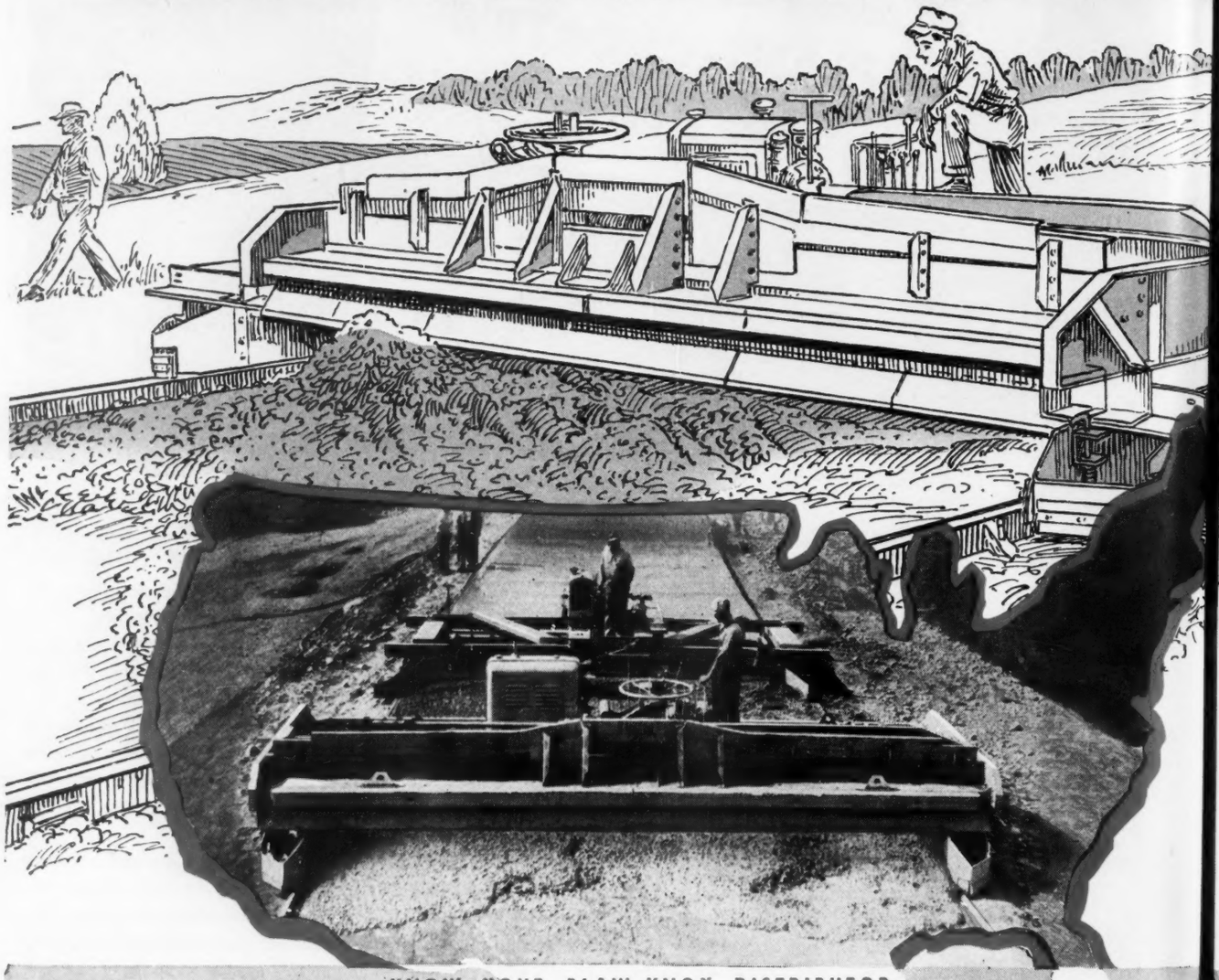

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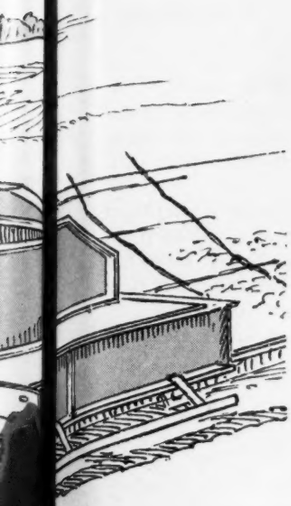

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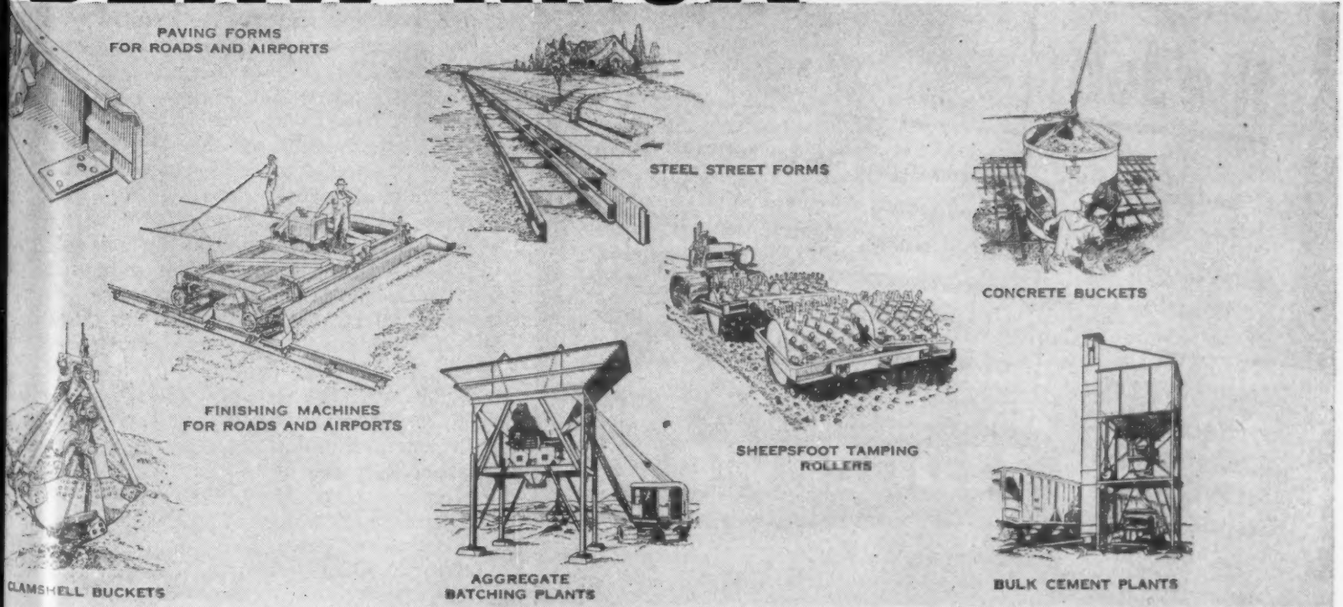

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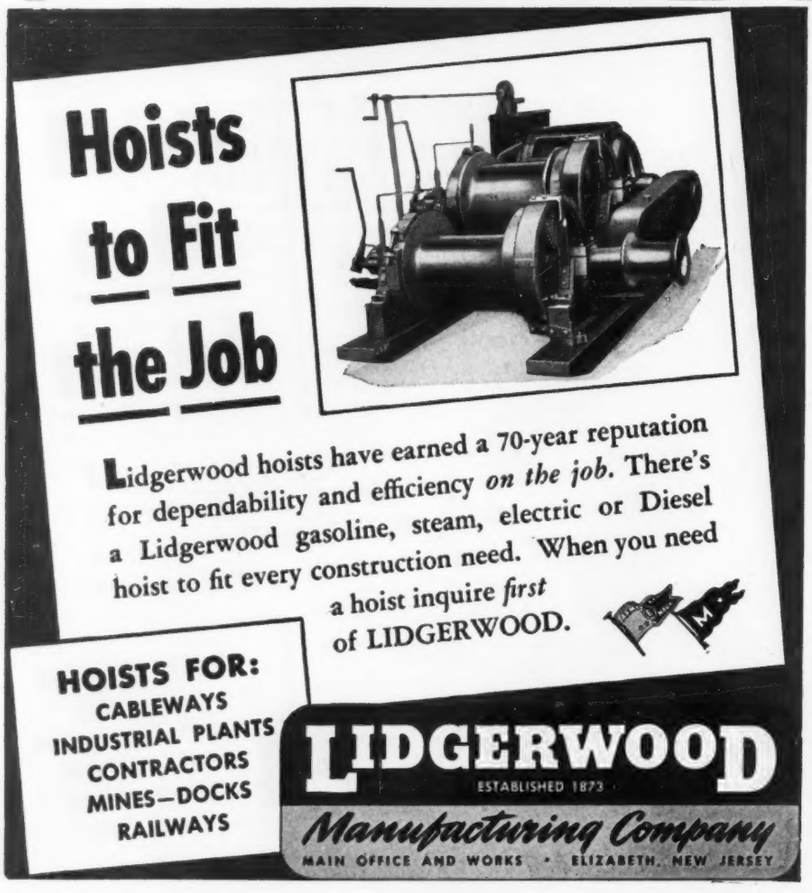
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(Continued from page 174)

enough on hand to pursue a good post-war construction program. There is almost enough to rehabilitate some of the countries they have devastated," Col. Redman concluded.

Germans Supply U. S. War Needs

German civilians have been turning out products for Allied war needs. Col. Redman said that many factories, making such items as prefabricated steel truss bridges, have been put back into operation.

Germany's world-famous chemical works, the I. G. Farben Co., located in the Saar Valley, has been taken over for military use by Com Z Engineers and is now producing supplies for the U.S. Army. At present, about 4,000 German workers are employed in the giant plant which stretches for several miles along the banks of the Rhine at Ludwigshafen. Although approximately 65 percent of its buildings were destroyed by Allied bombing, only 30 percent of the operating machinery was lost, according to the plant's German directors.

★ ★ ★

Inter-American Highway

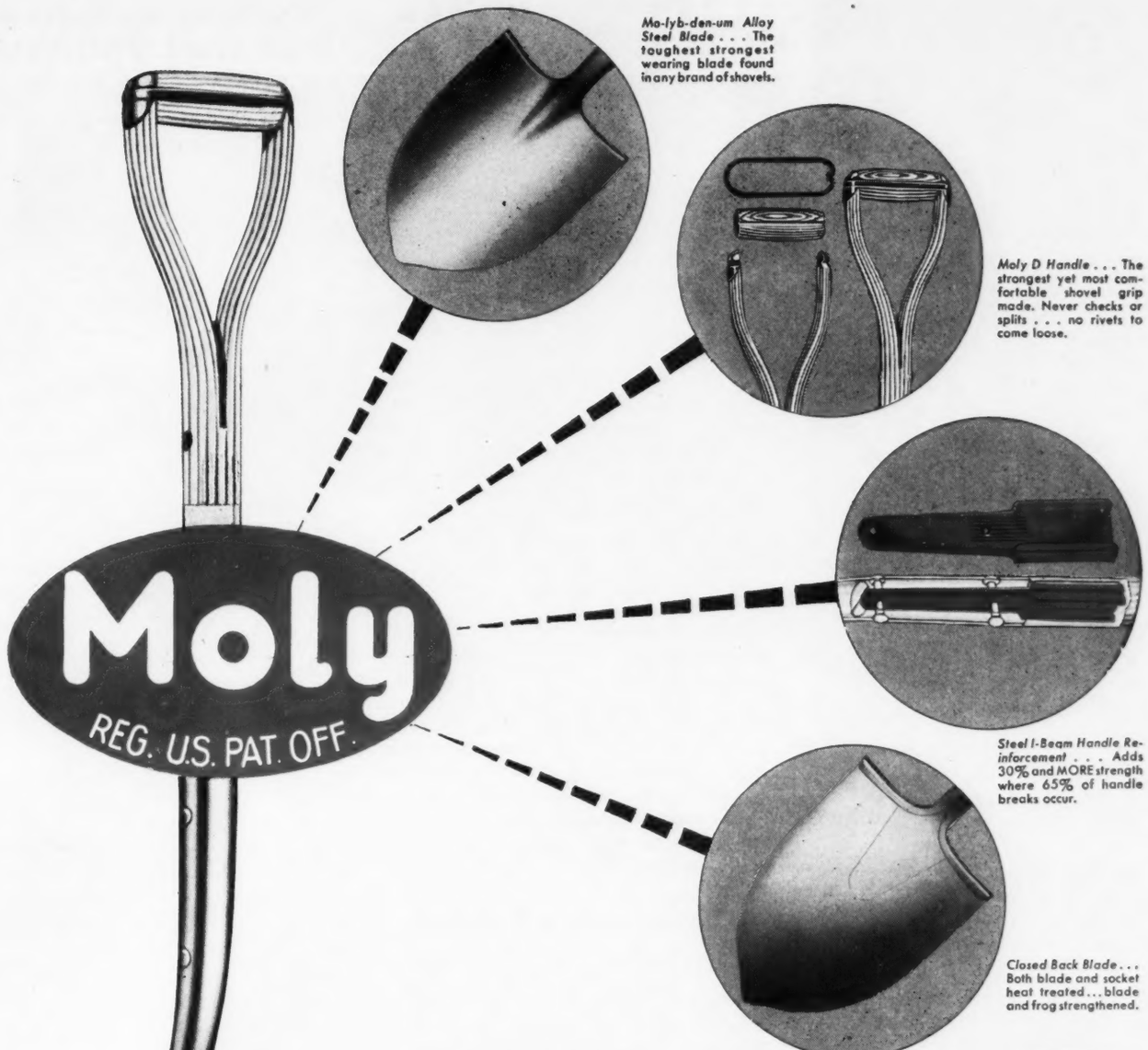
(Continued from page 88)

sented and will continue to present.

Not all of the problems have been caused by size, by the weather or by the altitude at which so much of the work has had to be done. Every job undertaken outside of the U. S. involves problems which are not encountered on work done within the country. The transportation of men, materials and machines to the site of the work always involves some expense, but on a job abroad the expense of transportation, though high, is the least of the problems. Under the war conditions which have prevailed during the last 2½ yr., the serious question has been, and continues to be, concerned with when shipments can be made and whether they can be made at all!

Supplies have been obtainable but their shipment has been difficult. Men can be had—if they can obtain permission to leave the country! Then, if ob-

(Continued on page 182)



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Steel I-Beam Handle Reinforcement . . . Adds 30% and MORE strength where 65% of handle breaks occur.

Closed Back Blade . . . Both blade and socket heat treated . . . blade and frog strengthened.

THEY ALL ADD UP TO Moly

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The Finest Shovel Made

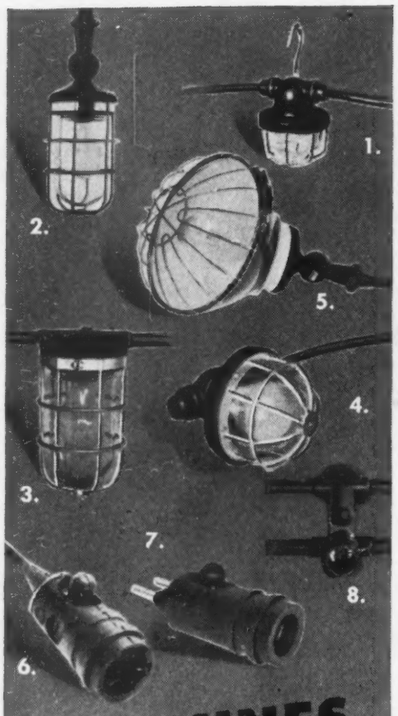
Moly shovels and scoops are all around better because each point of strain and wear is specially reinforced by an exclusive construction feature originated and developed by the Wood organization. Compare a Moly from end to end with any other shovel made and you'll find Moly markedly superior in ways that you can actually see.

Under normal conditions Moly shovels and scoops are available in the exact type and size required for the individual job. Get the habit *now* of specifying Moly when you buy shovels . . . because the name Moly on the order means final shovel costs which are lower.

THE WOOD SHOVEL AND TOOL COMPANY, PIQUA, OHIO

A National Organization *Specializing Exclusively* in Shovels, Spades and Scoops

MO-LYB-DEN-UM ALLOY SHOVELS



There's a **MINES**
Molded Lamp Fixture to Meet Any Portable Lighting Requirement

Mines Molded Lighting Fixtures, like Mines Molded Rubber Cable Connectors, are built for use under all kinds of conditions — underground, outdoors, oil fields, refineries — wherever there is a need for portable lighting.

A few of the available types are:

1. Vapor Proof Lamp Type C
2. Vapor Proof Lamp and Guard Extension or Pendant Type
3. Vapor Proof Lamp VPLG Molded in Cable
4. Vapor Proof Type C Extension
5. Vapor Proof Lamp with Reflector and Guard
6. Molded Lamp Socket with Water Proof Switch
7. Molded Detachable Socket with Water Proof Switch
8. String-A-Lite Molded Socket EHS

They may be made up in assemblies with cable and connectors or may be had on leads for splicing to your cables.

Combinations of types may be factory assembled on a cable length with end connectors forming String-A-Lite, a portable multiple lighting assembly.

Write for details of available types to meet your requirements.

MINES EQUIPMENT COMPANY

4245 Clayton Avenue
St. Louis 10, Missouri

(Continued from page 180)

tained and if cleared, they must be sent out by plane, for passage by steamer simply is not available. The question arises as to when plane space can be obtained and then as to how and by what means men, equipment and supplies can be transported to the site of the work once they are got to the country in which the work is to be done. The plain truth is that the means of getting about within even the smaller countries—roads, railroads and river transportation—are so limited that access to new projects may present very serious problems.

It was, as a matter of fact, necessary to do a major road construction job in building an access road from the coast to San Isidro to get equipment and supplies in to start work on the southern end of this road. At one point the access road crosses a range of mountains at an elevation of some 5,000 ft. Before it could be used, however, dock and unloading facilities had to be constructed at Dominical, the coast terminal, so equipment and supplies could be unloaded there. Warehouses, gasoline and diesel oil storage also had to be provided, and a camp built for the men working at this port. Also, camps had to be constructed at San Isidro and at other places along the line where the men could be housed and fed. At two of these camps, hospitals have been erected and at each of these hospitals a doctor and resident nurses are maintained.

Maintenance of Equipment

Machines used on construction work in the tropics require more care and maintenance than those performing similar tasks in this country. This is due in part to the conditions under which the work is done, and in part to the fact that operators are not always as careful in handling equipment as they should be. The number of local nationals who are qualified equipment operators, is limited. Local laws are apt to require the use of a large amount of local labor—as they do in this case—and in any event, contractors find it wise to train local men to handle heavy equipment, when possible.

The training of local nationals as operators has been emphasized on this particular project with excellent results. Still, in spite of the best of care in selecting the men to be trained, breaking-in of operators takes its toll of equipment. So, for one reason or another the equipment requires many repairs and in order to handle this work properly and expeditiously, well-equipped repair shops have had to be erected in several places.

To operate special repair shops it is

(Continued on page 184)

Worthington-Ransome Blue Brute Distributors

By referring to the advertisement on page 183, you'll learn the meaning of the (1), (2) or (1-2) beside their names.

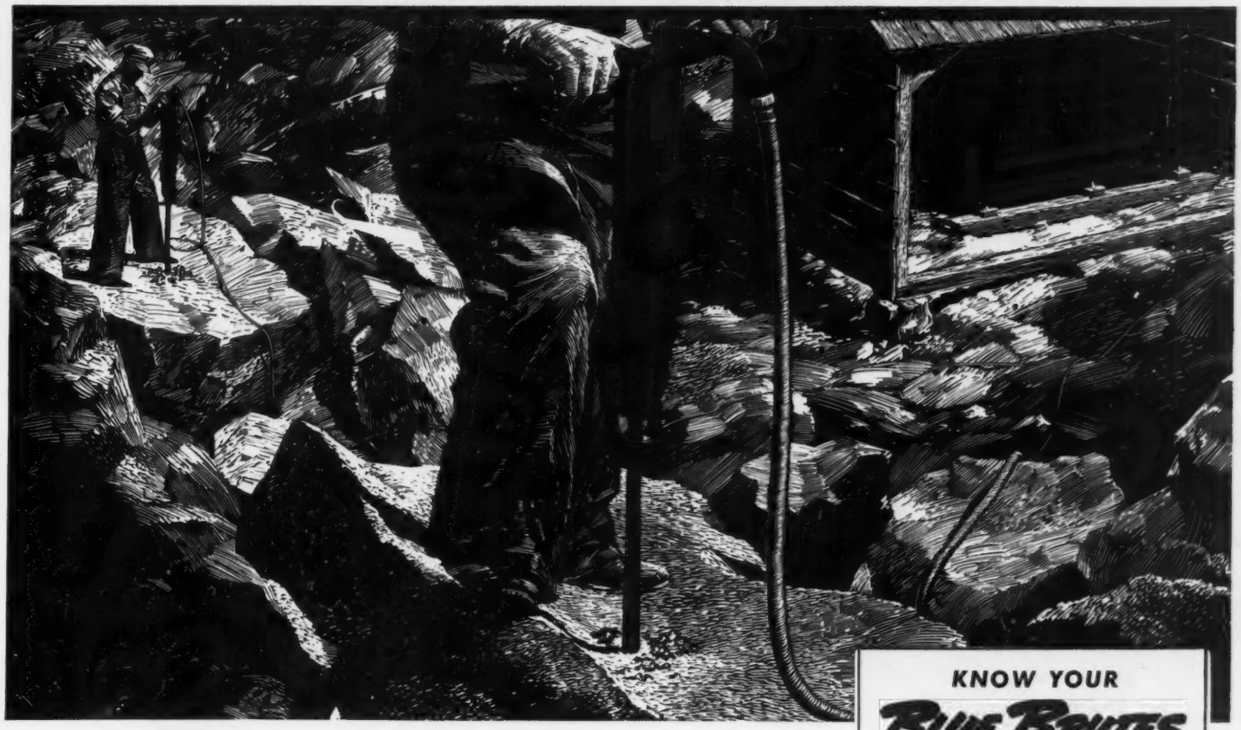
Ala., Birmingham (1) J. D. Pittman Tractor Co.
Ariz., Phoenix (2) Smith Booth Usher Co.
Ark., Fort Smith (2) R. A. Young & Son
Little Rock (1) Kern-Limerick, Inc.
Little Rock (2) R. A. Young & Son
Calif., Los Angeles (1) Garlinghouse Bros.
Los Angeles (2) Smith Booth Usher Co.
San Francisco (2) Coast Equipment Co.
Colo., Denver (2) John N. Meade
Denver (1-2) Power Equipment Co.
Conn., Hartford (2) The Holmes-Talcott Co.
New Haven (1) W. I. Clark
Waterbury (1) Contractors Supply Co.
Del., Smyrna (1) King-Burrous
D. C., Washington (1) M. A. Doetsch Machinery Co.
Fla., Jacksonville (1) Julien P. Benjamin, Inc.
Tampa (2) S. M. Regar
Ga., Atlanta (2) Tractor & Machinery Co.
Savannah (1) Morgans, Inc.
Ida., Boise (1-2) Olson Manufacturing Co.
Ill., Chicago (1-2) Chicago Construction Equipment Co.
Chicago (2) John A. Roche
Chicago (1) Thomas Hoist Co.
Ind., Fort Wayne (1) American Steel Supply Co.
Indianapolis (2) Reid-Holcomb Co.
Iowa, Des Moines (2) Electric Eng. & Const. Co.
Ky., Harlan (2) Hall Equipment Sales Co.
Louisville (2) T. C. Coleman & Son
Louisville (2) Williams Tractor Co.
Paducah (1) Henry A. Petter Supply Co.
La., New Orleans (1) Ole K. Olson Co.
New Orleans (2) Wm. F. Surgi Equipment Co.
Maine, Portland (1-2) Maine Truck-Tractor Co.
Md., Baltimore (1) Stuart M. Christhilf & Co.
Baltimore (2) D. C. Elphinstone, Inc.
Mass., Boston, Allston (1-2) Clark-Wilcox Co.
Cambridge (2) W. W. Field & Son, Inc.
Mich., Detroit (1) T. G. Abrams
Detroit (2) W. H. Anderson Co., Inc.
Flint (2) Gransden-Hall & Co.
Muskegon (1-2) Lakeshore Machinery & Supply Co.
Minn., Minneapolis (1-2) Phillippi-Murphy Equipt. Co.
St. Paul (2) D. L. O'Brien
Miss., Jackson (1) Jackson Road Equipment Co.
Mo., Clayton (1-2) The Howard Corporation
Kansas City (1) Brown-Strauss Corp.
Kansas City (2) Machinery & Supplies Co.
St. Louis (2) W. H. Reaves
Neb., Lincoln (1) Highway Equipment & Supply Co.
N. J., Hillside (2) P. A. Drobach
Newark (1) Johnson & Dealaman
North Bergen (2) American Air Compressor Corp.
N. M., Albuquerque (2) Bud Fisher Co.
Albuquerque (1) Morrow & Co.
Roswell (2) Smith Machinery Co.
N. Y., Albany (1-2) Milton-Hale Machinery Co.
Buffalo (2) Dow & Co., Inc.
New York (2) Air Compressor Rental & Sales
New York (1-2) Hodge & Hammond, Inc.
New York (1-2) Railroad Materials Corporation
Olean (2) Freeborn Equipment Co.
N. C., Raleigh (2) Carolina Tractor & Equipment Co.
N. D., Fargo (1-2) Smith Commercial Body Works, Inc.
O., Cincinnati (2) Finn Equipment Co.
Cleveland (2) S. M. Clancey
Cleveland (1) H. B. Fuller Equipment Co.
Cleveland (2) Gibson-Stewart Co.
Marietta (2) Northwest Supply & Equipment Co.
Toledo (1) Edmund Supply Co.
Toledo (2) M. W. Kilcorse & Co.
Okla., Oklahoma City (2) Townsco Equipment Co.
Oregon, Portland (2) Andrews Equipment Service
Pa., Allentown (2) H. N. Crowder, Jr., Inc.
Easton (2) Sears & Bowers
Harrisburg (2) N. A. Coulter
Oil City (2) Freeborn Equipment Co.
Philadelphia (1) Giles & Ransome
Philadelphia (2) Metalweld, Inc.
Pittsburgh (2) Atlas Equipment Corp.
Wilkes-Barre (2) Ensminger & Co.
Wilkinsburg (1) Arrow Supply Co.
York (2) George F. Motters Sons
S. C., Columbia (2) Smith Equipment Co.
Tenn., Knoxville (2) Wilson-Weesner-Wilkinson
Memphis (2) Tri-State Equipment Co.
Tex., Dallas (1) Service Equipment Co.
Dallas (2) Shaw Equipment Co.
El Paso (2) Equipment Supply Co.
El Paso (1) Mine and Smelter Supply Co.
Houston (2) Dye Welding Supply Co.
Houston (1) McCall Tractor & Equipment Co.
San Antonio (2) Patten Machinery Co.
San Antonio (1) San Antonio Machine & Supply Co.
Utah, Salt Lake City (1-2) Landes Engineering Co.
Vt., Barre (1-2) A. M. Flanders, Inc.
Va., Richmond (2) Highway Machinery & Supply Co.
Wash., Seattle (1) Columbia Equipment Co.
Seattle (2) Star Machinery Co.
Spokane (2) Andrews Equipment Service
Spokane (1) Columbia Equipment Co.
W. Va., Charleston (1) West Virginia Co.
Fairmont (2) Interstate Engineers & Constr., Inc.
Wisc., Milwaukee (1) Mekeel Engineering Co.
Wyoming, Cheyenne (2) Wilson Equipment & Supply Co.

Buy Blue Brutes

Worthington Pump and Machinery Corp.

Worthington-Ransome Construction Equipment Division
Holyoke, Massachusetts

MORE FOOTAGE FROM DRILL RUNNERS



When easy-handling Blue Brute Hand-held Rock Drills are powered by an easy-breathing 315′ Blue Brute Diesel-driven Compressor, for example, it's easy to understand why you can get more footage in less time at lower cost.

Your drill runners will work longer and steadier without tiring. That's because Worthington . . . pioneer in "ease-of-operation" drills . . . designs and makes its sturdy, hand-held drill to work *with* and *not against* the operator. He simply holds the drill while its powerful hammering rotation does the work.

Your Blue Brute Compressor will supply more air per gallon of fuel. That's because Worthington Feather* Valves — lightest, tightest, most efficient valve ever designed for compressor use . . . full-force feed lubrication throughout engine and compressor . . . unique idling control . . . all combine to keep performance at the peak and maintenance costs at rock-bottom.

For further proof that your best buys in rock drills, air tools and compressors are Blue Brutes, talk things over with your nearby Worthington Representative.

*Reg. U. S. Pat Off. H5.7

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute construction equipment will put your planning on a profitable basis and prove that *there's more worth in Worthington-Ransome.* Act now! His name is listed on page 182. The number beside his name indicates the Blue Brutes he handles.

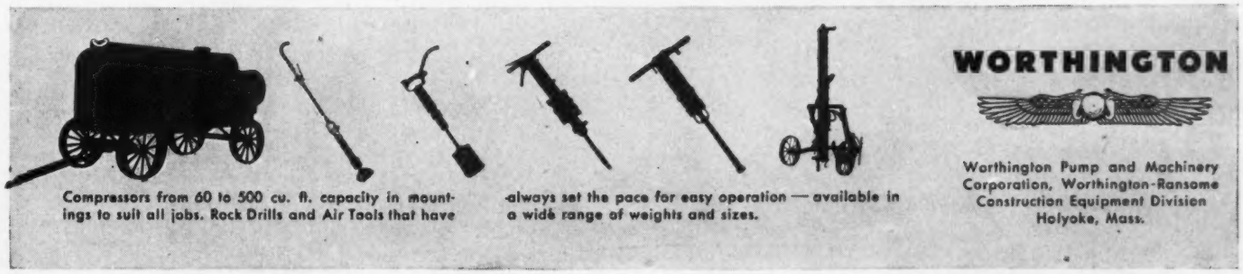
1.
Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing & Grouting Equipment, Truck Mixers, Plaster & Bituminous Mixers, and accessories.

2.
Blue Brutes also include: Diesel, gasoline and electric driven Portable Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps.**

**Postwar Products

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division Holyoke, Mass.

A HOOK *that* CAN'T LOSE ITS LOAD

The newly-designed latch (with stainless steel spring) gives Laughlin's unique Safety Hook a 25%-40% wider throat opening.

Don't chance accidents up above. Laughlin's Safety Hook keeps loads under control even if jolted in mid-air.

They are made of drop-forged steel, heat-treated. They're rugged. Get the details on these hooks with the improved type of latch.

OTHER LAUGHLIN HOOKS

Laughlin offers the most complete line of hooks, including grab hooks, hoist hooks, cargo hooks and other types, all heat-treated, drop-forged and weldless.

Distributed through mill, mine and oil field supply houses. For catalog, write Dept. 1, The Thomas Laughlin Company, Portland 6, Me.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

(Continued from page 182)

necessary to develop parts depots of considerable size. In this country a contractor depends on his dealer for spare parts. If his dealer does not have the parts needed, normally he can usually get them from the factory within a matter of hours. Abroad, the dealer, if there happens to be one, is not likely to have a considerable stock of spare parts. The volume of business he handles does not impress him as being large enough to warrant it, and, as a matter of fact, would seldom be large enough to warrant his carrying stocks of spare parts large enough to meet the requirements of a job of this size. This was the situation in Costa Rica. So, as it takes months instead of days to get a needed spare part to a job abroad, the contractor has been forced to maintain large stocks of parts.

As an aside, it may be observed that there is reason to feel that the "service" angle of the promotion of American equipment sales abroad could wisely receive more consideration. Machines operating abroad are quite as likely to break down as machines working in this country. On the whole they are more likely to break down as has been previously explained. Of course, having the machine is important to the man who owns it or it would not have been acquired.

Whether or not it will be considered a good machine, or the investment in it considered a wise one, is likely to depend more on whether it can be kept running than on anything else. That, in turn, is bound to depend very largely whether spare parts can be had promptly when they are needed. They cannot be had promptly if it is necessary to get them from a factory in this country. At home, manufacturers can, perhaps, afford to be a little lax in the enforcement of their desires as to the maintenance of dealers stocks of spare parts, for shipments by express are quick and not too expensive. Abroad, it takes so long to get the spare part which is not in stock that the importance of this matter is greatly enhanced. It is the writer's personal feeling that the sales of American equipment abroad will be disappointing wherever there is a failure to give to this phase of service the attention it deserves.

Swamp on Mountain Top

On the Inter-American Highway as on any large project, there has been the usual number of minor problems. They need no comment here. Also, there have been some unusual problems only one of which will be mentioned—a swamp at the top of a mountain. It is 2

(Continued on page 186)

REDUCE CONCRETE PLACING COSTS with NEW VIBER HIGH-SPEED VIBRATORS

Get stronger, denser concrete FASTER *with*

VIBER
Concrete Vibrators

High speed—9500 RPM in concrete! Powerful, rugged, portable, interchangeable Vibers help beat schedules.

Keep up with latest developments offered by the originators of internal concrete vibration. Write us today.

VIBER COMPANY

726 South Flower Street
BURBANK, CALIFORNIA

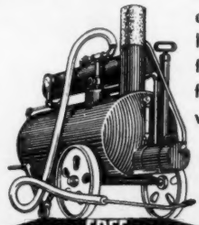
STEAM CLEANS FASTER

SIEBRING
PORTABLE-OIL BURNING STEAM CLEANER

Saves Man Hours!

Cuts Repair Time!

Your repair shop or maintenance department can save many precious man-hours using the low cost, portable Siebring Steam Cleaner. Instant steam cleans faster and cuts repair time. It's automatic, burns fuel oil, natural or artificial gas. Its low cost will surprise you.



- ***Portable, easy to move.***
- ***Sturdy construction.***
- ***Safe to use.***

10 DAY FREE TRIAL

You risk nothing. Sold on 10 day FREE TRIAL basis. Write for full details.

WRITE FOR FOLDER

Write today for complete and illustrated descriptive material on this remarkable steam cleaner. Address your inquiry to Dept. 700.

SIEBRING MANUFACTURING CO-GEORGE, IOWA

BIG, tough and rugged . . . and longer lasting, too! No words better describe Firestone Off-the-Highway tires.

They are exactly the tires you need on your equipment to increase yardage . . . to work more hours, with less time out for repairs . . . to lower maintenance costs . . . to increase profits.

Firestone Off-the-Highway tires are built for your toughest assignments. Their cord bodies are made from the strongest rayon, Gum-Dipped for multiple strength. Four extra tread plies cushion and absorb impact blows. Double-thick sidewalls add protection against rutwear and snags. Tough, cut-resistant tread rubber resists the rigors of rough and rocky haul roads.

That's why Firestone Off-the-Highway tires stay on the job longer. That's why they help you earn greater profits.

For the best in music, listen to the "Voice of Firestone" every Monday evening over N. B. C. network.

They're **Firestone**
OFF-THE-HIGHWAY TIRES

Copyright, 1945, The Firestone Tire & Rubber Co.

100% Self-Contained

SYNTRON

Gasoline Hammer

PAVING BREAKERS

Have Power To Spare—

Busting Concrete
Breaking Rock
Cutting Asphalt
Digging Shale and Clay—and other jobs.

No Air Compressor and Hose
No Battery Box and Cable
No Springs

Write for Bulletin 9-44.

SYNTRON CO.

500 Lexington Homer City, Pa.

REINFORCING STEEL —

THE REAL STRENGTH OF CONCRETE CONSTRUCTION

LACLEDE

AVAILABLE NOW IN BILLET OR RAIL STEEL GRADE—STRAIGHT OR FABRICATED

LACLEDE STEEL COMPANY

ST. LOUIS, MISSOURI

(Continued from page 184)

mi. across this swamp and it is a very real swamp! Lying in what presumably is the top of an extinct volcano, it looked serious until it was found that the area could be drained with little expense, by cutting through what is left of the rim of the old crater. Truly, the solutions to some problems were simple, but the solutions to others proved difficult. Still this project moves steadily toward completion and there is every reason to assume that in spite of the problems it has presented and will continue to present, another year's operations will place it in condition for use as a public highway good for many years of service.

★ ★ ★

Portable Shop Tools

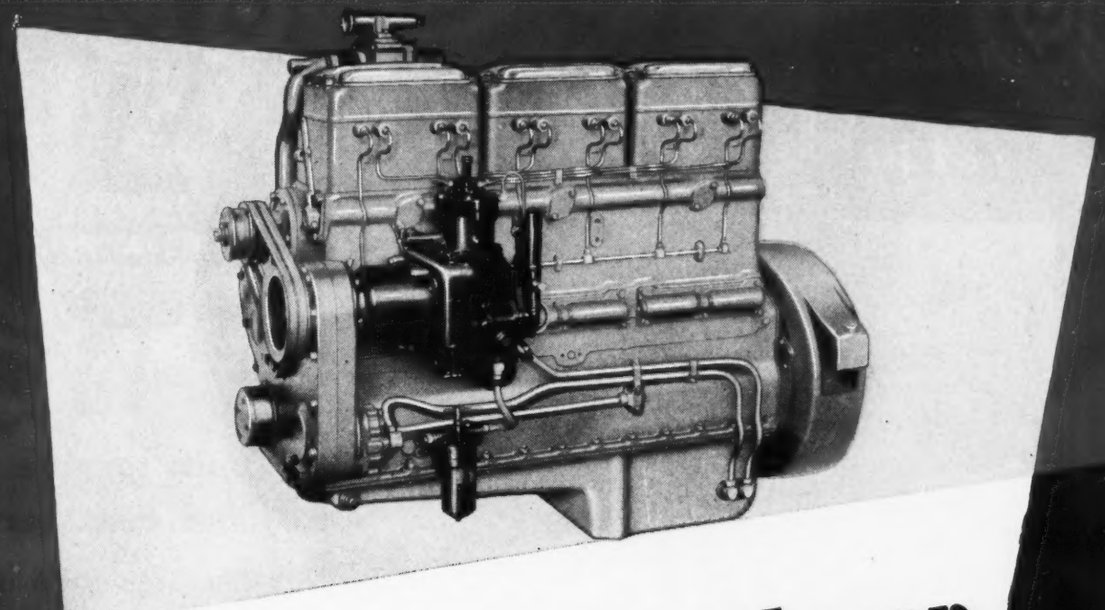
(Continued from page 77)

shops, leaving seven shop-and-storehouse units to be constructed in the district after the war.

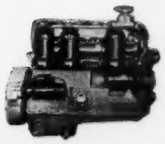
Minor maintenance work on gasoline and diesel engines can be performed at county shops, but reconditioning and rebuilding operations are reserved for the district maintenance center. Tools like those illustrated, which can be easily moved, set up and operated by one man, make it possible to do precision work on cylinders and valves at small cost in the district shop.

Organization

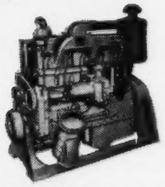
In a reorganization of the New York State Department of Public Works this year, all construction and operating functions with respect to state-owned facilities and structures were grouped under two main divisions, one for construction and the other for operation and maintenance. All maintenance shops are under the general direction of V. L. Ostrander, superintendent of operation and maintenance, who reports directly to the head of the department, Charles H. Sells, superintendent of public works. In the operation and maintenance division, power-driven equipment is a particular responsibility of J. W. Mulligan, chief motor equipment maintenance supervisor. At the Waterford shop, Ellis S. Staats is motor equipment supervisor for District 1.



The PROVED producer of low-cost yardage



Model HB-600: Automotive engine, 6 cylinders, 4⅞″ x 6″, 150 hp. at 1800 rpm. (maximum).



Model NHI-600: Power unit, 6 cylinders, 5⅛″ x 6″, 200 hp. at 2100 rpm. (maximum).

Model NHPS-600: Supercharged power unit, 6 cylinders, 5⅛″ x 6″, 275 hp. at 2100 rpm. (maximum).

The line of Cummins Dependable Diesels includes automotive, portable, stationary and marine models—50 to 275 hp.

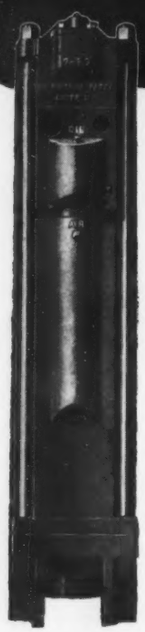
In choosing the power for your new earth-moving and material handling equipment, make sure that you get a *proved* producer of low-cost yardage. That Cummins Diesel power is such a producer—a producer of *faster, cheaper* yardage—has been demonstrated by its 12-year performance record in trucks, shovels, draglines, dredges, compressors, rock-crushers and virtually every other type of portable or stationary application. As a result, Cummins Dependable Diesels are now standard with successful contractors and aggregates producers everywhere . . . are offered as standard or optional power by leading construction equipment manufacturers.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana

CUMMINS *Dependable* DIESELS

SINCE 1919...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

McKiernan-Terry



PILE HAMMERS

For many years McKiernan-Terry Pile Hammers have been the choice of engineers and contractors on major construction projects throughout the world. Today they are used widely by Army and Navy Departments for construction and reconstruction work on ports, bridges, dams, etc. in every theatre of operations. To meet these and other heavy demands of the Army, Navy and Maritime Commission, our Dover and Harrison, N. J. plants have been greatly expanded. These enlarged facilities will be available at the close of the war for the many delayed peace-time projects requiring Pile Driving Equipment, Hoisting Equipment, Marine Equipment, Heavy Construction Equipment and/or Specially Engineered Equipment or Machinery.

McKIERNAN-TERRY CORPORATION

14 Park Row **New York 7, N. Y.**

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are built to give you 100 per cent service

Look at this gang of huskies tightening "dead end" and "Come Along" clamps on high tension wiring.

These men don't baby a wrench ever and Lowells stand up on the job without a whimper.

Look to Lowell for the solution of your Reversible Ratchet Wrench problems.

THE OLD RELIABLE WRENCH

Lowell Wrench Co.
Worcester, Mass.

MEN WHO OWN BLACK TOP PAVERS . . .

CHOOSE Adnun for OPERATING ECONOMY

EXPERIENCED MEN who have worked with all types of black top pavers . . . what do *they* think of maintenance costs on an Adnun Paver? Without exception they agree that the low maintenance costs of an Adnun are truly remarkable . . . far below the usual expenses which are encountered in other paving machines.

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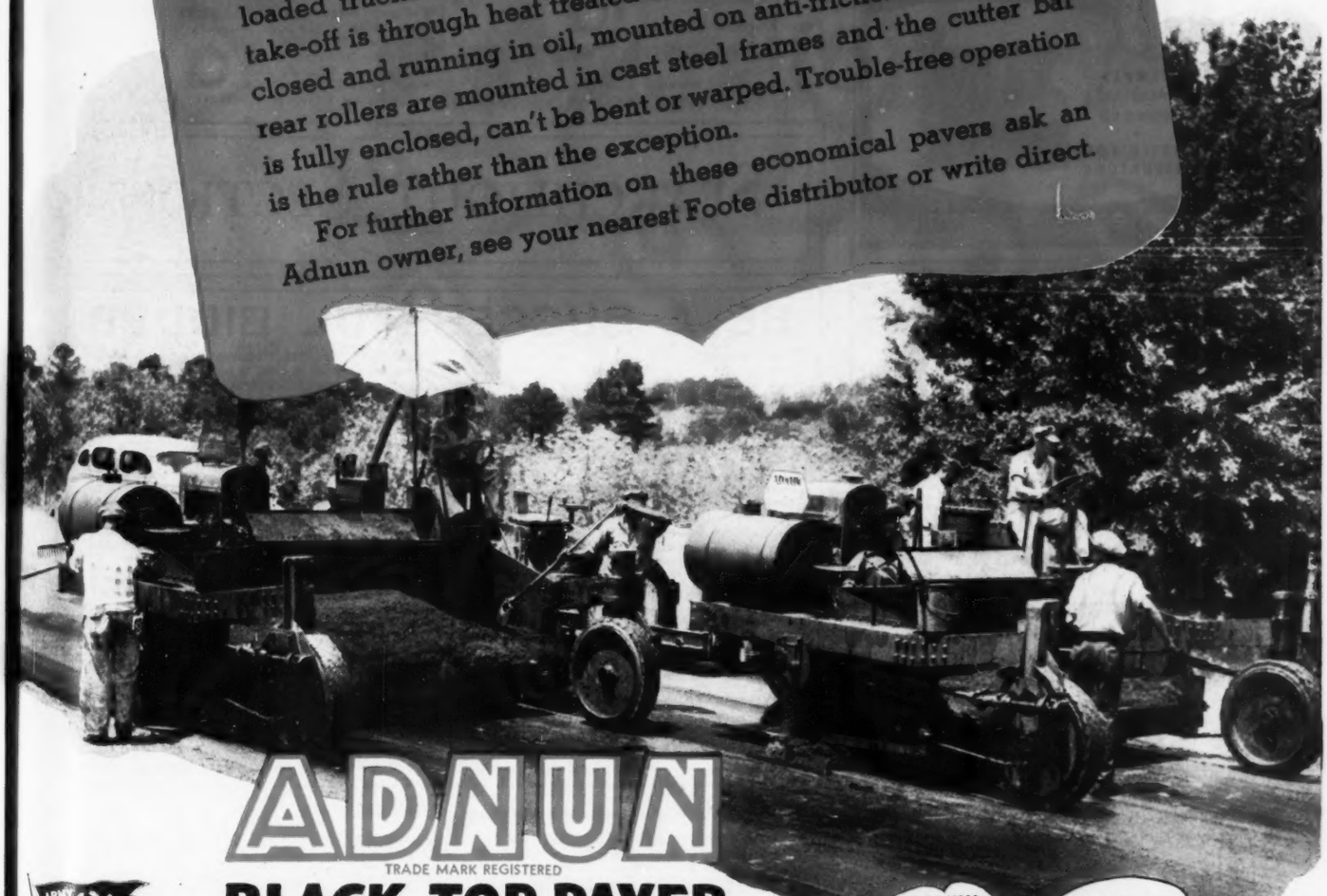
For further information on these economical pavers ask an Adnun owner, see your nearest Foote distributor or write direct.



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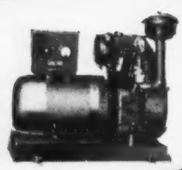
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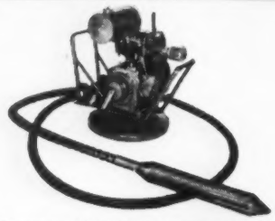
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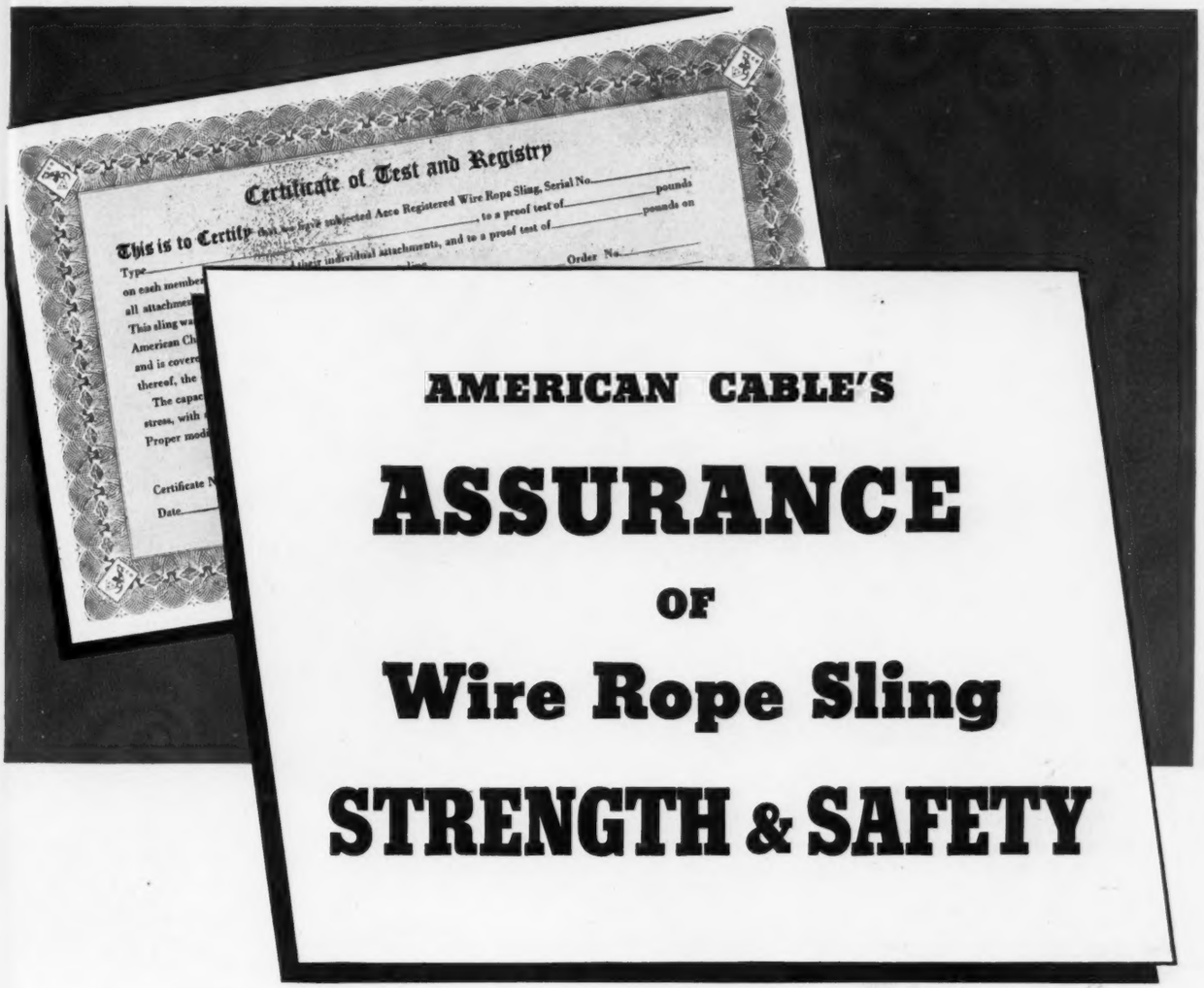

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